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The Moderating Role of the Home Environment and Parenting Beliefs on The Early Achievement Outcomes of Children With Difficult Temperaments

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THE MODERATING ROLE OF THE HOME ENVIRONMENT AND PARENTING BELIEFS ON THE EARLY ACHIEVEMENT OUTCOMES OF CHILDREN WITH DIFFICULT TEMPERAMENTS

by

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THE MODERATING ROLE OF THE HOME ENVIRONMENT AND PARENTING BELIEFS ON THE EARLY ACHIEVEMENT OUTCOMES OF CHILDREN WITH DIFFICULT TEMPERAMENTS

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This study examined the relationship of children's temperamental attention and activity (at 4-and-a-half years old) and proximal processes (parenting beliefs) and home environment in relation to children's achievement outcomes. Emphasis was placed on the moderating role of the home environment and parenting beliefs on the relationship between children's temperament (activity and attention level) and their academic achievement. The use of regression analyses specified that children's activity and attention were associated with achievement in reading and mathematics at 4-and-a-half years and reading, mathematics, and phonics achievement in the 1st grade. Analyses also depicted home environment and parenting as associated with the children's reading and mathematics achievement at 4-and-a-half years and reading, mathematics, and phonics achievement in the 1st grade. Conversely, home environment, and parenting beliefs did not significantly moderate the relationship between difficult temperament and achievement outcomes, such that the interaction between temperament and home environment and temperament and parenting beliefs did not significantly impact achievement outcomes at 4-and-a-half years or in the 1st grade. The findings presented signify the importance of understanding how the home environment and parenting beliefs work in concert with children's temperament to promote or inhibit their academic achievement outcomes.

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CHAPTER 1

INTRODUCTION

Children's early academic success is necessary for their long-term achievement outcomes and is linked to future successes in life, including employment and health (Easterlin, 2001; Subasi & Hayran, 2005). These future successes depend on a variety of factors, including academic skills, socio-emotional competence, self-regulatory abilities, and attention (Blair, 2002), and may be moderated by the home environment and parenting. Previous research has indicated that the child's academic achievement is relatively stable throughout childhood, but shows some fluctuations (Kowaleski-Jones & Duncan, 1998). These fluctuations in achievement can vary, and are commonly associated with differences in child temperament, particularly difficult temperament traits that make parenting children more challenging (e.g., high activity and anger), home environment, parenting, sex, and socioeconomic status (SES). Furthermore, research has supported the belief that children's early academic success has implications for their future achievement trajectories, and thus research on toddler, head start, and preschool years is abundant (McCall, Eichorn, & Hogarty, 1977; McCall, 1983; Duncan et al., 2007; McClelland et al., 2007), in addition research showing academic success during the first 3 years of formal schooling (e.g., kindergarten to second grade) sets a positive trajectory for future achievement success (Alexander, Entwisle, Blyth, et.al., 1988; Alexander, Entwisle, & Dauber, 1993).

Current research interest primarily has been with children between the ages of 4 and 6, as the expectation for the children to transition effective from daycare, or preschool environments into elementary school is potentially challenging. The challenge is for the child to implement varying self-regulatory skills, which can be determined by the characteristics of the child (temperament), the strength of proximal relationships (parenting) and the home environment

(Alexander & Entwisle, 1988). What we know less about are those children who are already in kindergarten and yet display difficult temperaments, and how those displays can be moderated by proximal influences. Examining these specific biological and social influences on children's academic outcomes is not novel, but a better understanding is necessary due to perceived classroom behavioral issues, child/teacher relationship issues, and lower achievement outcomes. Thus, the purpose of this study is to examine the moderating effects of the home environment and parenting on the relationship between children's difficult temperament and their achievement outcomes.

Theoretical framework

1.1 Bioecological systems theory

This study is grounded in Bronfenbrenner's bioecological model of human development. According to this model, child development is shaped not just by biological processes, but also by constant interactions that occur between the child and environment (proximal processes; Bronfenbrenner & Morris, 2006). Proximal processes occur bi-directionally, with influences from the child and the parent, and the child and their environment. For proximal processes to be productively meaningful, they need to take place consistently, and over an extended period of time. The defining properties of this model include: 1) Process, 2) Person, 3) Context, and 4) Time; this model is commonly referred to as PPCT.

Process involves the direct, proximal aspects of interactions between child and important people in his or her environment, such as a primary caregiver. Proximal processes include the interactions that occur between the individual and his or her environment, and are recognized as the primary mechanism in human development (Bronfenbrenner & Morris, 1998). Typically, the most important proximal interactions are those involving the parents; it is this relationship

that has a significant association with the child's achievement (Bradley, 1994), and constitutes what is arguably the strongest and longest-lasting relationship of early childhood, responsible for the foundation of the child's early environment (Bernier et al., 2012). Viewing the home environment as a place where the process takes place is important conceptually in understanding the bidirectional role of the home environment in the child's development in providing warmth, safety, and access to learning materials, helping to foster the social, cognitive and behavioral development of the child. This dynamic interaction between the child and the home environment can be understood as the child's "primary engines of development" (Bronfenbrenner, 1992, pp.8). Yet, understanding how the home environment can relate to the overall developmental pathways of the child is a monumental task. This is due to the numerous variables used to assess the relationship between the home and various outcomes (Bradley, Corwyn, Burchinal et al., 2001).

Person properties are perhaps the most instrumental in future development due to their effects on the direction and the power of proximal processes (Bronfenbrenner & Morris, 2006). Three types of person characteristics are *demand characteristics*, *resource characteristics* and *force characteristics* (Bronfenbrenner & Morris, 1998). Demand characteristics were previously referred to as personality (May, 1932), or "personal stimulus" characteristics (Bronfenbrenner & Morris, 1998). These characteristics are those that can influence interactions with another person including, temperament, age, gender, skin color, and physical appearances (Bronfenbrenner & Morris, 1998; Tudge, et al., 2009) and are likely to encourage or discourage reactions from the social environment and in turn influence proximal processes.

Resource characteristics include those factors that are not as recognizable, including mental and emotional resources such as past experiences, level of intelligence, and skill sets.

This concept also extends to social and material resources, which are defined as the person's access to nourishment, appropriate housing, caring parents, and opportunities for education (Bronfenbrenner & Morris, 1998; Tudge et al., 2009).

Finally, force characteristics are those that have to do with distinctions in temperament, motivation, persistence, and additional characteristics that can help shape the child's future direction, particularly achievement outcomes and proximal relationships (Bronfenbrenner & Morris, 1998; Gallagher, 2002; Tudge et al., 2009). Bronfenbrenner and Morris (1998) concluded that of all characteristics of the person that are likely to influence future development, and interfere with proximal processes by either enhancing or hindering their occurrence, the most powerful are the force characteristics. For example, two children can be from the same environment and afforded the same resources but if the two differ in motivation and persistence one will succeed while the other may not reach full potential. The degree to which temperament affects the child's engagement in proximal processes can be positive or negative. For example, for a child that is high in activity level, this particular force characteristic can draw negative reactions from the parents (Gallagher, 2002). The child does in fact contribute to the adjustment process through these characteristics, either positively or negatively.

The *environment,* or *context,* involves four interrelated systems. The first, the microsystem, involves the characteristics of parents, relatives, close peers, and mentors who participate in the life of the person on a continuous basis, such as the individuals within the child's home environment. Within this system the bidirectional nature of development is displayed, as the adult's behaviors affect the child, and the child's behaviors affect the adult. These reciprocal exchanges have long-term impacts on development (Collins et al., 2000), and

extend to contexts outside of the child's immediate surroundings, such as the formal learning environments, and the child's community.

Additional contexts that may be considered outside of the child's reach but contain the significant ability to affect the experiences and developmental pathways of the child (i.e., exosystem). This can include the parent's place of employment; for example, the workplaces of the parent(s) can indirectly support or hinder the child's development through work schedules, pay, and workplace stress. Finally, Bronfenbrenner coined the term "macrosystem" to be the context within which the individual develops that includes any group (i.e., "culture, subculture, or the social structure") that has shared values and belief systems, "resources, hazards, lifestyles, opportunity structures, life course options and patterns of social interchange" (1993, p. 25). This macrosystem is characterized by the child's gender, the society in which they are raised, religious experiences, political ideologies, SES (particularly education level of the parents, and income of the family), and their cultural experiences (race, ethnicity, and heritage). The macrosystem is then that which influences the direction of the child's understandings, thoughts, interpretations and experiences of the environment in which they live.

Time in this model points to the dynamic nature of the child's environment across time and how effects on the child are not uniform. Bronfenbrenner and Morris (1998) defined time as constituting micro-time (occurring during the course of an activity or interaction), meso-time (extent to which activities and interactions are consistent in the person's environment), and macro-time (refers to the chronosystem or historical events, such as living in the digital age). Bronfenbrenner and Morris (1998) refer to time as the defining property of the bioecological theory, and that processes can vary according to specific events, and as the child matures.

Within the current model, these aspects of Bronfenbrenner's theory suggests that force factors associated with difficult temperament will affect achievement within the formal learning environment (macrosystem interaction) while the interactions in the family and home environment (microsystem interactions) will moderate those macro interactions. This is a result of the supportive proximal processes not only leading to higher levels of cognitive functioning, but serving to reduce and act as a buffer against some biological (temperament, gender) and environmental (SES) obstacles to achievement within the formal learning environment.

1.2 Temperament as a Risk Factor

Child temperament is referred to as constitutionally-based individual differences in children's reactivity and regulation (Rothbart & Derryberry, 1981). As described by Rothbart and Derryberry (1981), the *constitutional* nature of temperament means that it is "the relatively enduring biological makeup of the individual, influenced over time by heredity, maturation, and experience" (p. 40). Reactivity is defined as the individual's intensity and duration of response toward a stimulus. Regulation then would be the process that helps to moderate reactivity. This includes the ability to shift attention, regulate thoughts and emotions, and inhibit inappropriate behavior (Rothbart & Derryberry, 1981).

The biological nature of temperament makes it a *force* characteristic and the influences of temperament therein cover aspects of the PPCT model including *person* (heredity), and *time* (maturation and experience). Dimensions of temperament that are shown to be particularly salient to the cognitive and academic development of children are attention, a regulatory dimension, and activity level, a reactive dimension (Kochanska, Murray, & Harlan, 2000; Sethi, Mischel, Aber, Shoda, & Rodriguez, 2000).

Attention refers to the child's ability to transfer or shift focus from one activity or task to another, and to sustain attention as needed (Gartstein & Rothbart, 2003). Evidence suggests that

attention abilities may be more predictive of children's achievement than problem behaviors (Barriga et al., 2002; Hinshaw, 1992; Konold & Pianta, 2005; Ladd, Birch, & Buhs, 1999; Normandeau & Guay, 1998; Trzesniewski, Moffitt, Caspi, Taylor, & Maughan, 2006). Attention is critical particularly in the school environment as it is necessary for children's ability to focus on important tasks even in the face of multiple, competing stimuli. Attention can be likened to a partner in the cognitive processes, responsible for maintaining goals and helping to override activities incongruent with the achievement of long-term goals.

Previous research has shown that children can be temperamentally susceptible to attention problems due to biological (genetic) factors (Martin, 1994; Stevenson 1992). This possible susceptibility to low attention in particular hinders a child's ability to successfully use working memory, follow instructions, carry out behaviors, complete relevant behavioral tasks, and solve problems (Rothbart & Posner, 2005; Rueda, Rothbart, McCandliss, Saccomanno, & Posner, 2005). Additional research shows that the child's ability to control attention, and participate in classroom activities is a consistent predictor of classroom performance, and high achievement on test scores during preschool and early elementary years (Alexander, Entwisle, & Dauber, 1993; Kos et al., 2006). For example, Duncan and colleagues (2007) found that attention assessed at the child's entry into school predicted of reading and mathematics skills in later grades. Claessens and Dowsett (2014) found that children who are low in attentional focusing are more likely to have lower achievement, particularly during the early years of elementary school. In this same study, children who displayed an increase in attention skills across the kindergarten year realized an increase in their achievement in both reading and mathematics. McClelland and colleagues (2013) found that attention assessed at age 4 was a predictor of the college success of those same children.

Activity level refers to a child's desire to be physically active (running or jumping up and down) in response to environmental stimuli (Rothbart & Jones, 1998); thus, activity level is an aspect of *reactive* temperament. Generally, highly active children run from place to place, skip and hop, talk fast, and move at a quicker pace than those low in activity (Buss, 1989). Within the formal learning environment, highly active children exhibit frustration and restlessness when they have to conform to the confines of the classroom; in addition, active children can appear to be poorly regulated, and are prone to being more disruptive in the typical classroom environment (Rothbart & Jones, 1998). In context, activity level can be positively or negatively demonstrated, with adverse and positive outcomes. For example, a number of studies have focused on the benefits of physical activity on cognition, and specifies that physical activity can improve the child's working memory (McMorris, Sproule, Turner, & Hale, 2011) and attention (Chaddock, Erickson, Prakash, et al., 2010; C.L. Davis et al., 2011). In addition, the beneficial aspects of activity extend into the classroom, with the phsycial activity and the fitness level of the child correlating positively with academic achievement (Becker et al., 2014; Donnelly & Lambourne, 2011). In contrast, Rudasill and colleagues (2010), have also found that activity level at 4 ½ years (rated o CBQ) was positively related to 3rd grade performance on reading and math, concluding that activity in early childhood is viewed positively, but as kids age, it is viewed negatively. Martin and colleagues (Martin, Drew, Gaddis, & Moseley, 1988) found that children with higher activity levels are related to adverse achievement in early school years. The context is then important when considering whether the child's high activity is a positive display or in fact negative. Within the classroom, it is assumed that high activity can then be viewed as disruptive behavior.

1.3 Child gender

Within the *PPCT model*, child gender is viewed as a demand characteristic, which is a characteristic that can immediately influence another person (e.g., parent) and plays an important part in the parents' behaviors and expectations towards their child. The influences of this demand characteristic on the developmental pathways of the child are well documented, particularly how this biological characteristic may also factor into the child's temperament displays, social, classroom, and home environments (Mullola et al., 2012; Matthews, Ponitz, & Morrison, 2009; Martin, Wisenbaker & Baker et al., 1997; Bayly & Gartstein, 2013; McClowry, Rodriguez, & Tamis-LeMonda et al., 2013; Else-Quest, Hyde, & Goldsmith et al., 2006). For example, the temperament displays of the child can be different due to gender (e.g. boys higher in activity than girls), girls are shown to be more socially adept than boys (ref), and within the home fathers and mothers are shown to rate the temperaments of their children differently in regards to the child's gender (mothers likely to rather boys as higher in activity than they are observed to be) (father's rate son's activity as normal).

Indeed, previous research has shown gender differences in child temperament. Else-Quest et al. (2006) reviewed results from 191 published and unpublished studies from 1960-2002, measuring the magnitude of gender gaps in temperament. In terms of activity, boys displayed higher levels on average, and the gaps between boys and girls groups increased across childhood. Overall, previous research has supported the belief that boys tend to be more active and impulsive in their behaviors, and girls typically display behaviors that are more reserved, and less intense. In addition, research on attention showed that the gender gaps favored females; meaning girls are more likely to focus their attention appropriately (Else-Quest et al., 2006). This important notion is supported by additional research by Sulik and colleagues (2010),

depicting gender differences in effortful control (a temperamental construct that includes attention) with boys lagging in comparison to girls.

The role of gender and temperament in the context of parenting has been documented in previous research and further supports the concept of the bidirectional nature of the relationships that exist within the child's immediate environment. Differences in the child's behavior vary according to the caregiver reports (mother vs. father) and research shows mothers depicting boys as exhibiting frustration more than girls (Diener & Bradshaw, 2002). In addition, Gordon (1983) found that the father's estimates of children's temperament displays were often rated higher regarding their sons (e.g. exhibiting more anger) and daughters (e.g. displaying more fear) Theoretically, such reactions by the parents to the child's demand characteristics fit as a response to the child's gender and the child's force characteristic (temperament). How these responses shape the child's academic outcomes in combination with additional variables may prove to be important in understanding the depth of the critical role parenting plays in their child's development.

In general, parent-report measures of temperament have been used to examine mother's and father's ratings of their own children, yet this method is seen as biased and as posited by Bates (1980), to be made of objective components (children's actual behaviors) more than subjective components (parents' perceptions). Through previous research these parent reports revealed that mothers indicated their sons exhibit more frustration compared to daughters (Diener & Bradshaw, 2002). Plant and colleagues (2000), also found that cultural expectations led men to express more anger than women, which could explain why parents rated their sons higher on anger than girls. In contrast, it is generally acceptable for fear to be demonstrated in girls and not boys, which can lead to either over or underrating fear in girls and boys (Brody &

Carter, 1982). Father's are also more likely to engage their children in a manner that is gender driven (Siegal, 1987) such as speaking in a stern voice with males, and a softer voice with girls; it may be that father's are more apt to gender bias in rating the temperament of their children than mothers due to societal and cultural norms (Parade & Leerkes, 2008). Gender bias in temperament illustrates the role of demand characteristics in the way a parent interacts with the child and its influence on outcomes.

1.4 Socioeconomic status (SES)

SES is a characteristic of the macrosystem with a large effect on the microsystem as it relates to social and material resources (e.g., food, housing, educational opportunities) that can facilitate or hinder developmental processes. Previous research has depicted SES as a contributing factor to child temperament (e.g., Jansen et al. 2009) and academic outcomes (e.g., White, 1982; Coplan et al. 1999; Malecki & Demaray, 2006; Metcalfe et al; 2013), and as having a large contribution to the quality of (?) the home environment. Certainly children from lower SES homes are more likely to display difficult temperaments in comparison to higher SES peers; and, children residing in economically disadvantaged families often display behavioral and emotional problems (Bradley & Corwyn; 2002). For example, Jansen and colleagues (2009) examined the association between SES and temperament in infants six months old and found lower SES was associated with more difficult temperament (defined by higher scores on activity level, duration of orienting, and fear). In addition, mothers with low education, in comparison to mothers with high education, had children with more difficult temperaments.

In terms of implications for academic achievement, there is clear evidence that economic deprivation has lasting consequences for children's academic success. Duncan, Brooks-Gunn and Klebanov (1994) sought to understand the impact of economic deprivation on early

childhood development using a sample of 489 black, 101 Hispanic, and 304 white primarily poor children (ages 0-3). They found children living in persistent poverty (defined as those experiencing deprivation that lasts for an extended period of time, and whose per capita income levels are persistently below the poverty line; Gaiha, 1989; Gaiha & Deolalikar, 1993; Hulme & Shepherd, 2003;) had average IQ scores 9.1 points (more than a half standard deviation) lower than children who were never poor. Poverty was also associated with significantly worse developmental outcomes, especially for those in persistent poverty. The effects of persistent poverty were twice as large as that of transitional poverty (e.g., temporary poverty due to job loss), a finding that underscores the importance of poverty for cognitive development because it suggests that the longer a child is in poverty the more susceptible they are to hunger, malnutrition, illiteracy, lack of access to basic services, and social isolation. In addition, Duncan and Magnuson (2005) used a meta-analysis to study the effects of socioeconomic circumstances of white, black, and Hispanic children and gaps in school readiness in US preschoolers. Differences in SES explained half of a standard deviation in achievement score differences between groups of students in lower SES categories and those in middle SES categories. It was also found that SES played a stronger role in preschoolers' development compared to older children. Thus, the first few years of life, especially in poorer households, are particularly important in the developmental processes of a child (Rijlaarsdam, Stevens, et al. 2013).

Within this study family SES was measured utilizing the mother's education level. Parental education is a widely accepted indicator of SES measuring human capital (e.g., Conger & Dogan, 2007; Conger & Donnellan, 2007; Hoff, Laursen, & Tardif, 2002; Oakes & Rossi, 2003). Human capital affects children's development by influencing parent's current and long-term goals for their children (Conger & Donnellan, 2007; Preston et. al., 2013). For example,

parents' education may directly shape expectations for their children while providing more opportunities for educational attainment and outlets. Research has shown that more highly educated parents may spend more time communicating with their children and partnering with their children in learning tasks (Conger & Dogan, 2007; Guo & Harris, 2000). The benefits of parental education may have lasting impacts on the development and achievements of children (Preston et al., 2013).

1.5 Home environment

Within the bioecological systems theory, the child's environment or context involves any environment, including the home, school, or peer groups where the person spends a majority of their time engaging in specific activities (microsystem) (Tudge, Mokrova, Hatfield & Karnik, 2009). It is within the physical environment where a lack of clear structure, and unpredictability, can suppress the developmental processes of the child. Previous research has linked problematic home environments during the child's first three years with an array of developmental issues, including poor language development, behavioral problems, delays in school readiness, aggression, depressive symptoms, and impaired cognitive development (e.g., Evans et al., 2010; Trentacosta et al., 2008; Vernon-Feagans et al, 2011). Within this research, the main focus has been on potential effects of low SES aspects of the home environment (McLoyd, 1998; Yeung & Conley, 2007; Burchinal et al., 2011; Rijlaarsdam et al., 2013). Family SES is often used as an indicator of resources available in the home environment (e.g., learning materials.) and the resources available in the home or lack thereof is correlated with low achievement, and partially explains the achievement gap (White, 1982; Yeung & Conley, 2007), future developmental pathways (McLoyd, 1998; Bradley & Corwyn, 2002), and school readiness (Aikens & Barbarin, 2008). Despite its frequent use, SES is often seen as a distal measure of a family's standing

within a specific demographic, and stops short of capturing the proximal influences on development within the home environment (Pierce, Alfonso & Garrison, 1998).

The role of the home environment is particularly interesting, as research has shown consistent associations between the home environment and the child's temperament. Particular aspects of research on the home environment that are relevant to this study include quality of the environment, level of chaos, and parental activity (Leventhal & Brooks-Gunn, 2000; Pettit, Bates, & Dodge, 1997). Wachs' (1998) research showed that children's home environment plays a pivotal role in their expression of temperament, stating that the conditions must be ideal for the display of any particular dimension of temperament. Certain features of the home environment can elicit responses that are adaptive or maladaptive. For example, home environments with minimal structure, ineffective routines, and disorganization, are factors associated with mal-adaptive behaviors and lower achievement outcomes. In contrast, the layout and size of the living environment and the availability of basic necessities and materials that are useful in encouraging learning and growth are shown to associate with the child's ability to self-regulate, impulsivity, and internalizing and externalizing behaviors (Dumas et al., 2005; Valiente, Lemery-Chalfant, & Reiser, 2007). With the majority of *temperament x home environment* interactions focusing on the chaotic aspects of the home environment, this leaves an area that remains largely untapped. What is less well known is the extent to which the quality and quantity of stimulation and support from parents in the home moderates the relationship between difficult temperament and academic achievement.

1.6 Parenting

The affective relationships between parents and children are instrumental to the quality of the child's home environment. Previous research has shown parenting behaviors and practices to

be strong predictors of the child's well being in a variety of domains (Bradley et al., 2001). Parenting affects the emotional regulation and cognitive abilities of the child (Diamond, 2013); importantly, supportive parenting enhances the child's ability to develop cognitively, through scaffolding and the implementation of rules and structure (Landry, Miller-Loncar, Smith, & Swank, 2002). Supportive parenting is a direct reflection of a parent's display of high levels of warmth and acceptance, and willingness to respond appropriately to a child (Ainsworth, Blehar, Walters, & Wall, 1978; Bornstein & Tamis-LeMonda, 1989). Parents who are engaged and attentive to the needs of their children, and emotionally supportive, are also supporting their children's self-regulated thoughts and behaviors by contributing to children's perception that he or she is cared for, highly regarded, and that they are valuable members within the home environment. This emotional support towards children, enhances their ability to function appropriately in changing environments, assists in managing stress and can help moderate adverse outcomes (Dubow, Tisak, Causey, Hryshko, & Reid, 1991; Malecki & Demaray, 2002; Towe-Goodman et al. 2014). This supportive contribution to the regulatory development of children has an important influence on the child's early behavioral and academic competence (Blair & Razza, 2007; Valiente, Lemery-Chalfant, Swanson & Reiser, 2008). The main-effects model, which proposes that social support has a positive effect on cognitive outcomes, supports this connection and while environmental stressors are controlled. The social support that is offered to children, providing them with resources, positive interactions, affect, and stability are linked with improved academic performance, confidence and behavioral adjustment, while offsetting the negative effects of poverty (Holt & Espelage, 2005; Gaylord-Harden et al., 2007; Kerpelman et al., 2008).

This support is primarily through the parental figure and are exhibited in two styles: authoritative and authoritarian. The authoritative style of parenting is when parents set limits, use reasoning with their children, allow them the opportunity and the space to explore their environment, and encourage autonomy. Parents using an authoritative style are highly supportive, and this is demonstrated through high levels of positive response and tending to the emotional needs of the child. Baumrind (1991) explained that the authoritative parent is both demanding and responsive. That is, authoritative parents impart clear and direct standards for child conduct, and are assertive but do not intrude on the child's desire for autonomy. Importantly, their disciplinary actions are seen as supportive and not physically punitive. Research has shown that authoritative parenting is associated with children maintaining a higher level of social competence (Steinberg et al., 1994), and negatively associated with internalizing and externalizing issues in childhood (Steinberg, et al., 1994).

In contrast, the authoritarian parenting style includes portrayals of negativity, hostility, and absolute control, or over-control of the child and the home environment. Parents using this style are low in support. This style is also characterized by "high parental control, verbal hostility, restrictiveness, and punitive discipline strategies"(Robinson, et al., 1995). Burchinal (1991), describes authoritarian parents as demanding with their directives, with minimal or no response towards the true needs of their children. The authoritarian parent demands obedience and the "do as I say" mentality without explanation, and relishes an environment where there are clear sets of regulations, and deviation from those regulations is met with clear and harsh discipline. The authoritarian style of parenting correlates highly with children's internalizing and externalizing behaviors, and delinquent behaviors (Thompson et al., 2003). Previous research has focused on parenting at a single point in the child's development; however, in

accordance with the bioecological model, understanding the influence of parenting across time should provide a greater understanding of this proximal influence on the child's behavior (Deater-Deckard, 1998; Putnam & Sanson, 2002; Belsky, 2007; Bradley & Corwyn, 2008; Pettit & Arsiwalla, 2008; Neece, Green & Baker, 2012). As previous research by Dierckx and colleagues (2011), found that parental supports is viewed as a buffering effect against children with high activity, and it was in this absence of high activity that the children were able to focus their attention, thus regulating appropriate behaviors.

1.7 Current study

A number of studies have considered social processes in conjunction with temperament displays in children (Jansen, Raat, Mackenbach et al., 2009; Kiff, Lengua, & Bush, 2011; Molfese, Rudasill, Beswick et al., 2010; Montirosso, Cozzi, Putnam et al., 2010; Rudasill & Rimm-Kaufman, 2009; Singer, Stefflre, & Thompson, 1958), and the role of the home environment in relation to cognitive outcomes (Elardo & Bradley, 1981; Wachs, 1978; Walberg & Marjoribanks, 1976). To facilitate an understanding of the bi-directional influences on the child's development, this study will focus on proximal processes between the child and the parent, a relationship defined as the key consideration in the child's development (Bronfenbrenner & Ceci, 1994). An additional goal is to capitalize on incomplete applications of Bronfenbrenner's theory of development, and appropriately apply the *PPCT* concepts. Previous research has focused on only one element of the theory (e.g., *person*), but in order to understand the role of proximal influences it is important to include more than one of the elements at a time.

Thus, the purpose of the proposed study is to examine the extent to which difficult temperament traits predict academic outcomes, and how that relationship may vary as a function of the home and parenting environments. That is, can a positive home environment and caring

parenting buffer children with more difficult temperament traits from negative academic outcomes? Within this framework the specific research questions are as followed:

1) To what degree do attention and activity level account for variability in children's achievement outcomes?
2) To what degree do parenting beliefs moderate associations between children's temperaments and their subsequent achievement outcomes?
3) To what degree does the home environment moderate associations between children's temperaments and their subsequent achievement outcomes?

We expect that children who have low attention and high activity levels displayed within the classroom environment will perform poorer on achievement measures. Due to the rather stable nature of temperament, it is expected that the resultant poor performance in achievement will continue in subsequent grades. However, it is hypothesized that supportive parenting and a supportive home environment will moderate the effects of low attention, and high activity levels in children. This follows previous research showing parenting behaviors that are considered authoritative and supportive will foster behaviors in children that can promote regulation, and social-emotional competence (Baumrind, 1989; Coplan, Reichel & Rowan, 2009). It is anticipated that home environments affording opportunities for development (e.g., reading, playing), and with less household chaos, will promote healthy proximal relationships, and will moderate behavioral and emotional reactivity and self-regulatory processes (Chen, Deater-Deckard & Bell, 2014).

CHAPTER 2

METHODS

Participants

SECCYD

In 1991 the National Institute of Child Health and Human Development (NICHD) began a longitudinal Study of Early Child Care and Youth Development (SECCYD). The SECCYD was conducted to address questions and concerns about the enduring relationships between the child's childcare experiences, childcare characteristics, and the developmental outcomes of children. This 10-location study in Little Rock, AR; Irvine, CA; Lawrence, KS; Boston, MA; Philadelphia, PA; Pittsburgh, PA; Charlottesville, VA; Morganton, NBC; Seattle, WA; and Madison, WI, used a diverse sample of children and families and was conducted in four phases, with Phase I (birth through 3 years of age), Phase II (4-and-a-half years through 1st grade), Phase III (through 6th grade), and Phase IV (through 9th grade).

Recruitment of Sample

The recruitment and selection criteria of the parents and child participants in the NICHD SECCYD were randomly sampled and the criteria are described and available for background information (http://www.icpsr.umich.edu/icpsrweb/DSDR/series/233/studies/21941?classification=DSDR.VIII.*&permit;permit%5B0%5D=AVAILABLE&q=SECCYD&searchSource=revise&paging.startRow=1); a short summary of that information follows. Participants were

initially recruited from select hospitals at 10 data collection sites within the United States with recruitment beginning in January of 1991, and completion on November 1991. Parents with full-term healthy newborns were chosen for enrollment, and were selected according to conditional random sampling. Exclusions included mothers younger than 18 at the time of the child's birth, families who knew they were not going to remain in the area for at a minimum of three years, children with obvious disabilities at birth, or those children who were hospitalized for more than seven days after their birth, and mothers who are not fluent speakers in English.

Description of Sample

Data for the current study are drawn from the second phase of the SECCYD study (1995-1999), which covers children 4-and-a-half years of age to the first grade. The phase 2 sample included n=1,220 of the original 1, 364 children (705 = male, 659 = female), of varying ethnicities (Am Indian = 5, Asian = 22, Black = 176, White = 1097, 64 = Other/Hispanic). Of these participants, complete data were available for n = 487 children, thus, analyses were calculated with both the original data (n = 487), and with imputed data (n = 1220), pooled imputed data resulted in higher R^2 *and* $R^2\Delta$ values, of importance no coefficients reached significance due to imputed data versus original data. Thus, the reported data will be from the original data set, with missing data listwise option chosen in SPSS.

Procedures

Trained researchers in all 10 data collection sites completed assessments of children and parents within their home environment (social and physical characteristics), child-care (e.g. after-school) environment, the formal learning environments, and in a laboratory playroom. The assessments were made on children's development, such as social, emotional, intellectual and language development, behavioral problems, and adjustment, and physical health.

Measures

Socioeconomic Status.

Socioeconomic status was measured using the income-to-needs ratio, which is a standard measure of a family's economic status. Family income was divided by the federal poverty threshold (accounts for the size of the household) for the family, then income-to needs was averaged across a 3 year period (e.g., when the child was 1, 2, and 3 years of age) thus providing the income-to-needs ratio. When the measure was taken in Phase I from 1991-1995 the average poverty threshold for a two, three, four, and five person homes were $9,165, $10,860, $13,924, and $16,456 respectively. Families with cash incomes, before taxes, that exceed these thresholds are considered "not poor," whereas families with income falling below them are "poor." For example, if a family of three whose income totaled $35,000 would have income-to-needs ratio of 3.2 (= $30,000/$10,860) and be considered non-poor in that year, by definition an income-to-needs ratio of 1.0 is indicative of family income that is equal to the poverty threshold. Of the families in the study, 16.7% had an income-to-needs ratio below 1.0, and 18.4% had an income to needs ratio between 1.0 and 1.99.

Social Factors

***Parenting Behaviors*.** Parenting behaviors, including the parent's beliefs on child rearing and education, were measured when children were 4-and-a-half years old and in first grade using the *Parental Modernity Scale of Child-Rearing and Educational Beliefs* (Schaefer & Edgerton, 1985). This 30-item questionnaire was given to mothers, fathers and caregivers, with two subscale scores: 8 items for Progressive Beliefs (attitudes favoring self-directed behaviors, "children learn better by doing things themselves than listening to others") and 22 items for Traditional Beliefs ("parental rules must conduct their children's behavior"). To be consistent with the scoring for this measure in the NICHD study's common data set, a Total Traditional

Beliefs score was the sum of the Traditional items and the Progressive items, with the Progressive items reversed. For subscales, the score is calculated by adding the 8 items and to the existing 22, a high value signifying conservative and modern beliefs with respect to child rearing and education. A score that taps the total value of the traditionalist beliefs will be calculated by adding up the traditional items and the inverted values obtained at the progressive items, a high score reflecting the strong authoritarian beliefs. Internal consistency ranged from .88 to .94 and test-retest reliability was calculated at .84.

Home Environment. The level of stimulation and support available within the home environment was measured at 4-and-a-half years using the *Early Childcare H.O.M.E. Inventory* (Caldwell & Bradley, 1984). The questionnaire contains 57 items clustered into 8 subscales: 1) Learning Materials, 2) Language Stimulation, 3) Physical Environment, 4) Parental Responsivity, 5) Learning Stimulation, 6) Modeling of Social Maturity, 7) Variety in Experience, and 8) Acceptance of Child. Each item is scored using a binary scoring system (yes = 1, no = 0).

The alpha coefficient for the total score across all subscales was .82 (alphas for subscales ranged from .26 to .57), although alphas were calculated for scales, it is not a particularly useful statistic for estimating scale reliability. Alpha is overly sensitive to scale length (Cortina, 1988); and most HOME subscales contain less than 8 items. Moreover, HOME is an inventory of objects, events, actions and conditions that presumably promote child well-being; it is not a measure of a one-dimensional underlying construct. It composed of cause rather than effect indicators, thus there is no assumption regarding dimensionality (Caldwell & Bradley, 1984). The focus of this measure is on the child and how he or she interacts with the objects, events, and family members in the

home, and specific parenting behaviors within the home (sensitivity, acceptance, lack of negativity). A sample item for learning materials is: *Two or more toys which help children learn numbers* (e.g., number books, games, puzzles, clocks, computer games, blocks, playing cards, etc.). A sample item for language stimulation is: *child is encouraged to learn the alphabet.* Sample items for physical environment are: *Outside play environment appears safe; neighborhood is aesthetically pleasing.* Sample items for responsivity: *parent usually responds verbally to child's speech; parent caresses, kisses, or cuddles child during visit.* Sample items for academic stimulation: *child is encouraged to learn numbers; child is encouraged to learn to read a few words.* Sample items for modeling: *child can express negative feelings without harsh reprisal; TV is used judiciously.* Sample items for variety: *child is taken on outing by a family member at least every other week; child eats at least one meal per day with mother and/or father.* Sample items for acceptance: *parent does not scold or yell at or derogate child more than once; no more than one instance of physical punishment occurred during the past week.* Higher total HOME scores indicate a more enriched home environment. Even though no cut-off points are specified in the manual, the range of scores falling in the top and bottom quarter and the middle half are reported on the Summary Sheets (Caldwell & Bradley, 2001). In general, scores falling in the lowest fourth of the score range indicate an environment that may pose a risk to some aspects of the child's development.

Child Characteristics

Children's Temperament. Children's temperament was measured at 4-and-a-half years using maternal report on the *Children's Behavior Questionnaire* (CBQ; Rothbart, Ahadi, & Hershey, 1994). Fifteen aspects of temperament are assessed with 196 items that relate to the child's reactions to different situations. The measure was modified in the NICHD SECCYD, as

it required the mothers to complete only 80 items from 8 scales from the original measure. In the current study, only two subscales were used: Activity (10 items) and Attention (9 items). Items are rated on a 7-point scale from 1 = extremely untrue to 7 = extremely true to show the child's specific reactions during the past 6 months. For example, the Activity subscale items include "Seems always in a hurry to get from one place to another." Attention subscale items include "When picking up toys or other jobs, usually keeps at the task until the job is done." In the SECCYD, alphas for the eight subscales range from .60 to .85 for mother reports.

Child Learning Outcomes

Achievement. Child achievement at 4-and a-half years and first grade was assessed using subtests from the Woodcock-Johnson Test of Achievement –Revised (WJ-R ACH; Reference). Subtests used at 4-and-a-half years were Letter-Word Identification and Applied Problems; in first grade, those same subtests and Word Attack were used.

The Letter-Word Identification subtest measures the child's ability to match a picture representation of a word with the actual picture of the object, and reading identification skills in identifying letters and words. The items increase in difficulty as the test presents words that appear less frequently in the written English language.

The Applied Problems subtest measures the child's ability to analyze and solve problems in mathematics. Applied Problems requires the child to analyze and solve math problems and the child must recognize the appropriate procedures to follow in order to successfully solve the given problems with simple calculations. To solve the problems, the child must listen to the problem, recognize the procedure to be followed, and then perform relatively simple calculations. Because many of the problems include extraneous information, the student must

decide not only the appropriate mathematical operations to use but also which numbers to include in the calculation.

The Word Attack subtest measures the child's ability to apply phonic and structural analysis skills to the pronunciation of unfamiliar printed words. The child reads aloud letter combinations that are linguistically logical in English but that do not form actual words (nonsense words), or words that constitute low-frequency words in the English language.

WJ-R uses a standard score scale which is based on a mean of 100 and a standard deviation of 15. This scale is the same as most deviation-IQ scales and may be used to relate standard scores from the WJ-R to other tests scores based on the same mean and standard deviation. The WJ-R also includes extended standard scores that make possible a greater range of standard scores (0 to 200). The standard score is then interpreted with a percentile rank. A percentile rank describes performance on a scale from 1 to 99 relative to the performance of some segment of the norming sample. This segment is at a specific age level. The subject's percentile rank indicates the percentage of subjects in the selected segment of the norming sample who have scores the same or lower than the subject's score.

Approach to Analysis

First, means and standard deviations were calculated for all variables, and partial correlation coefficients were calculated with and without the control variables (SES, gender). See Tables II-VIII. Next, a series of hierarchical regression analyses were used to assess the links between mathematics and reading achievement outcomes and child temperament (activity and attention), as moderated by parenting beliefs and the home environment. Accordingly, analyses were conducted with reading and mathematics achievement scores regressed on temperament (activity and attention), parenting and the home environment with gender and SES

entered as control variables, and all two-way interactions between temperament and proximal relationships (home environment and parenting) (Baron & Kenny, 1986). Control variables (SES, gender) were entered in block 1,temperament (activity and attention) were entered in block 2, parenting beliefs and home environment were added in blocks 3 and 4, respectively, and interaction terms were added in blocks 5 and 6 (activity x parenting, activity x home) (attention x parenting, attention x home).

The analyses were conducted using Baron and Kenny's (1986) conceptualization of the role of the moderator and its influence on variable outcomes. The moderator is described as "the variable that affects the direction and/or strength of the relation between an independent or predictor variable and a dependent or criterion variable (pp. 1174)." In accordance with Aiken and West's (1991) procedures described for examining moderators, all of the variables used in interaction terms (e.g., activity, attention, home environment, and parenting beliefs) were centered. In addition, for ease of interpretation all of the variables used in the regression analyses were also centered.

CHAPTER 3

RESULTS

Our research questions asked:

1) To what degree do attention and activity level account for variability in children's achievement outcomes?
2) To what degree do parenting beliefs moderate associations between children's temperament and their subsequent achievement outcomes?

3) To what degree does the home environment moderate associations between children's temperament and their subsequent achievement outcomes?

Correlations

For detailed correlations including those of gender and SES refer to tables II – VIII. Children within this sample had moderate to high levels of activity and attention and these variables were significantly, negatively correlated (r = -.40). Regarding the proximal influences, home environment was significantly correlated with reading (r =.41), mathematics (r = .41), activity (r = -*.16)* and attention (r = .34). In contrast, parenting beliefs had no significant correlations with reading, mathematics, activity or attention at 4-and-a-half years. Conversely, in the 1st grade, parenting beliefs were significantly correlated with reading (r = -.19), mathematics (r = -.30), and phonics scores (r = -.23), in addition to being significantly correlated with attention (r = -.28), and activity level (r = .11).

Predicting Reading at 4-and-a-half years

Refer to tables IX and X for results from all blocks. SES and child gender were entered into Block 1, explaining 5.5% of the variance in reading scores at 4-and-a-half years ($F_{(2, 522)}$ = 15.246, p <.001, R^2 = .055), which is a statistically significant contribution as SES was positively associated with reading scores (β = .23, p < .001), but gender was unrelated (β = .01, p = .74). That is, children from higher SES homes had higher scores on the reading assessment. In Block 2, children's temperament (activity level, attention level) accounted for 10% of the variance in reading scores ($F_{(4, 520)}$ = 14.799, p < .001, R^2 = .102) with an $\Delta R2$ of 4.7%, together a statically significant contribution (activity level, β = .04, p = .35) (attention, β = .23, p < .001). That is, activity was unrelated to reading scores, but higher attention predicted higher reading scores.

In Blocks 3 and 4 we entered our proximal variables of interest (parenting, home environment), and in block 3, parenting accounted for 10.4% of the variance in reading scores ($F_{(5, 519)} = 12.039$, $p = .32$, $R^2 = .104$), with an ΔR^2 of .002% a statistically non-significant contribution ($\beta = .04$, $p = .32$). Block 4, included the home environment, which accounted for 19.5% ($F_{(6, 518)} = 201.931$, $p < .001$, $R^2 = .195$) of the variance in reading scores, with an $\Delta R2$ of 9.1% a statistically significant F change. That is, higher HOME scores predicted higher reading scores at 4-and-a-half years.

In block 5 the interaction between activity x parenting ($F_{(7,517)} = 17.392$, $p = .70$, $R^2 = .195$) showed explained less than 1% of additional variance in reading scores at 4-and-a-half years ($\beta = -.12$, $p = .70$). Specifically, the interaction between parenting and activity level was not significantly related to reading achievement at 4-and-a-half years. Similarly, in block 6 the interaction between activity x home environment ($F_{(8,516)} = 15.723$, $p = .52$, $R^2 = .196$), remained non-significant explaining less than 1% of additional variance in reading achievement ($\beta = .24$, $p = .52$), such that the interaction between activity and the home environment did not moderate reading achievement. In addition, terms for interactions between attention and caregiver beliefs and home environment were added in a separate model. In the model including attention x caregiver beliefs in block 5 ($F_{(7, 517)} = 18.104$, $p = .29$, $R^2 = .197$), the interaction explained less than 1% of additional variance in reading achievement with a non-significant moderation ($\beta = .04$, $p = .29$). In block 6, ($F_{(8,516)} = 15.846$, $p = .63$, $R^2 = .197$) the interaction between attention x home environment at 4-and-a-half years explained less than 1% of additional variance in reading achievement with a non-significant moderation of temperament on children's reading scores at 4-and-a-half years ($\beta = .020$, $p = .63$).

Predicting Mathematics Performance at Age 4-and-a-half years

Refer to tables XI and XII for results from all blocks. SES and child gender were entered into Block 1, explaining 6.8% of the variance in mathematics scores at 4-and-a-half years ($F_{(2, 521)} = 18.958$, $p < .001$, $R^2 = .068$), which is a statistically significant contribution as SES was positively associated with mathematics scores ($\beta = .25$, $p < .001$), but gender was non-related ($\beta = .06$, $p = .16$). In block 2, children's temperament (activity level, attention level) was entered accounting for 15.1% of the variance in reading scores ($F_{(4, 519)} = 23.093$, $p < .001$, $R^2 = .151$) with an ΔR^2 of 8.3% a statically significant contribution by attention focusing ($\beta = .31$, $p < .001$), and a non-significant contribution by activity level ($\beta = .060$, $p = .23$). That is, activity did not predict children's math scores, but higher attention predicted higher math scores. In block 3, parenting at 4-and-a-half years ($F_{(5, 518)} = 18.471$, $p = .71$, $R^2 = .151$) accounted for 15.1% of the variance in children's mathematics scores at 4-and-a-half years, with no ΔR^2, and was not a statistically significant contribution to mathematics scores ($\beta = .02$, $p = .71$). In block 4, home environment was added ($F_{(6,517)} = 25.094$, $p<.05$, $R^2 = .226$) accounting for 22.6% of the variance in mathematics scores at 4-and-a-half years a significant ΔR^2 of 7.4% ($\beta = .317$, $p < .001$) depicting that home environment significantly contributed to mathematics scores, such that the higher the HOME inventory score, the higher the children's mathematics scores at 4-and-a-half years.

In block 5 the interaction between activity x parenting ($F_{(7,516)} = 21.521$, $p = .59$, $R^2 = .226$) showed explained less than 1% of additional variance in mathematics scores at 4-and-a-half years ($\beta = -.16$, $p = .59$). Specifically, the interaction between parenting and activity level was not significantly related to mathematics achievement at 4-and-a-half years. Similarly, in block 6 the interaction between activity x home environment ($F_{(8,515)} = 18.840$, $p = .60$, $R^2 =$

.226), remained non-significant explaining less than 1% of additional variance in mathematics achievement (β = - .20, p = .60), such that the interaction between activity and the home environment did not moderate mathematics achievement. In addition, terms for interactions between attention and caregiver beliefs and home environment were added in a separate model. The model including attention x parenting in block 5 ($F_{(7, 517)}$ = 21.469, p = .94, R^2 = .226) however, the interaction explained less than 1% of additional variance in mathematics achievement (β = .00, p = .94). In block 6, ($F_{(8,516)}$ = 18.922, p = .30, R^2 = .227) the interaction between attention x home environment at 4-and-a-half years explained less than 1% of additional variance in reading achievement with a non-significant moderation of temperament on children's mathematics scores at 4-and-a-half years (β = .04, p = .30).

Predicting Mathematics Performance in 1st grade

Refer to tables XIII and XIV for results from all blocks. SES and child gender were entered into Block 1, explaining 7.2% of the variance in mathematics scores in the 1st grade ($F_{(2, 876)}$ = 33.955, p <.001, R^2 = .072), which is a statistically significant contribution as SES (β = .25, p < .001) and gender (β = -.09, p = .01) were positively associated with mathematics scores. Such that the higher the SES, the higher the children's mathematics scores. In step 2, children's temperament (activity level, attention level) was entered accounting for 12.3% of the variance in mathematics scores with an ΔR^2 of 5.1% a statically significant contribution by attention focusing (β = .25, p <. 001), with activity level (β = .063, p = .07). That is, activity was unrelated to reading scores, but higher attention predicted higher reading scores.

For block 3, caregiver beliefs at the 1st grade was added ($F_{(5,873)}$ = 32.576, p< .001, R^2 = .157) accounting for 15.1% of the variance in mathematics scores in the 1st grade, a statistically significant ΔR^2 of 3.4% (β = -.20, p < .001). In block 4, the home environment was added ($F_{(6,}$

$_{872)}$ = 34.257, $p < .001$, $R^2 = .191$) accounting for 19.1 % of the variance in mathematics scores in the 1st grade, an ΔR^2 of 3.7%, depicting home environment to be a significant contribution to mathematics scores ($\beta = .22$, $p < .001$).

In block 5 the interaction term activity x caregiver beliefs in the 1st grade ($F_{(7, 871)}$ = 29.582, $p>.05$, $R^2 = .192$) accounted for less than 1% of the variance in mathematics scores, with a non-significant F change, and a non-significant contribution to the model ($\beta = .04$, $p = .23$). In block 6 activity x home environment remained non-significant ($F_{(8,870)} = 25.909$, $p = .55$, $R^2 = .192$) and accounted for less than 1% of the variance in mathematics scores ($\beta = -.02$, $p = .55$). In addition a separate model included the interaction between attention and caregiver beliefs in the fifth block ($F_{(7,871)} = 29.336$, $p = .84$, $R^2 = .191$) showed the interaction explained less than 1% of additional variance in mathematics scores in the 1st grade, which is a non-significant interaction ($\beta = -.01$, $p = .84$). In block 6 the interaction between attention level and home environment ($F_{(8.\ 870)} = 25.660$, $p = .72$, $R^2 = .191$) explained less than 1% of additional variance in mathematics achievement which is a non-significant interaction ($\beta = .01$, $p = .72$).

Predicting Reading Performance in 1st grade

Refer to tables XV and XVI for results from all blocks. SES and child gender were entered into block 1, explaining 2.5% of the variance in reading scores in the 1st grade ($F_{(2, 876)}$ = 11. 255, $p< .001$, $R^2 = .025$), a significant contribution from gender ($\beta = .072$, $p = .03$) and SES ($\beta = .14$, $p < .001$). In step 2, children's temperament (activity level, attention level) was entered ($F_{(4, 874)} = 16.038$, $p < .001$, $R^2 = .068$) accounting for 6.8% of the variance in mathematics scores with a significant ΔR^2 of 4.3%. Attention was positively associated with 1st grade reading achievement ($\beta = .23$, $p < .001$), but activity level was unrelated ($\beta = .06$, $p = .08$).

That is, activity was unrelated to reading scores, but higher attention predicted higher reading scores.

In block 3, parenting beliefs in the 1st grade ($F_{(5, 873)} = 15.276$, $p = .001$, $R^2 = .080$) accounting for 8.0% of the variance in reading achievement in the 1st grade, an $\Delta R2$ of 1.2%, also a statistically significant contribution ($\beta = -.12$, $p = .001$). In block 4, home environment was added ($F_{(6,872)} = 20.548$, $p < .001$, $R^2 = .124$) and accounted for 12.4% of the variance in 1st grade mathematics scores, a significant $\Delta R2$ of 4.3% ($\beta = .25$, $p < .001$). Results indicate that the higher the HOME scores at 4-and-a-half years, the higher the children's mathematics scores in the 1st grade.

In block 5 the interaction between activity x caregiver beliefs in the 1st grade ($F_{(7, 871)} = 17.599$, $p>.05$, $R^2 = .124$) was entered with the interaction explaining less than 1% of the variance in children's reading scores in the 1st grade, a non-significant interaction ($\beta = .05$, $p = .84$) . In block 6, the interaction between activity x home environment ($F_{(8, 870)} = 15.508$, $p = .35$, $R^2 = .125$) was entered with the interaction explaining less than 1% of the total variance in children's reading scores in the 1st grade, remaining a non-significant interaction ($\beta = -.35$, $p = .35$). Additional analyses were conducted to test the interaction between attention and caregiver beliefs in the 1st grade ($F_{(7,871)} = 17.732$, $p = .35$, $R^2 = .125$) showed the interaction explained less than 1% of additional variance in reading scores in the 1st grade. Specifically, the interaction between caregiving beliefs at the 1st grade and attention level was not significantly related to reading achievement in the 1st grade ($\beta = -.19$, $p = .35$). With the interaction between attention level and the home environment the model remained non-significant ($F_{(8, 870)} = 15.644$, $p = .31$, $R^2 = .126$) as the interaction explained less than 1% of additional variance in reading

achievement and the interaction term did not significantly effect children's 1st grade reading scores (β = .44, p = .31).

Predicting Phonetics Performance in 1st grade

Refer to blocks XVII and XVIII for results from all blocks. SES and child gender were entered into block 1, explaining a significant 1.7% of the variance in phonics scores in the 1st grade ($F_{(2, 875)}$ = 7.344, p<.05, R^2 = .017). SES was positively associated with phonics scores (β = .13, p < .001), but gender (β = .01, p = .88) was unrelated. In step 2, children's temperament (activity level, attention level) was entered accounting for 6.4% of the variance in phonics scores ($F_{(4,873)}$ = 14.826, p < .001, R^2 = .064), with an ΔR^2 of 4.7% a statically significant contribution to phonics scores in the 1st grade. With activity level (β = .096, p = .01) and attention focusing (β = .24, p < .001) having positive associations. For block 3, caregiver beliefs in the 1st grade accounted for 8.7% of the variance in 1st grade phonetics scores ($F_{(5, 872)}$ = 16.591, p < .001, R^2 = .087), a significant ΔR^2 of 2.3%, with caregiver beliefs negatively associated with phonics scores (β = -.17, p < .001). In block 4, home environment was added to the model ($F_{(6,871)}$ = 18.006, p < .001, R^2 = .110) accounting for 11% of the variance in phonetics scores, a significant ΔR^2 of 2.3%, with home environment being positively associated with phonics scores (β = .18, p < .001).

In block 5, activity x caregiver beliefs in the 1st grade ($F_{(7, 870)}$ = 15.416, p = .99, R^2 = .110) was added, and explained less than 1% of additional variance in phonetics achievement in the 1st grade (β = .00, p > .99). In addition, the interaction term between activity x home environment ($F_{(8, 869)}$ = 13.565, p = .42, R^2 = .111) was added, and also explained less than 1% of additional variance in phonetics achievement in the 1st grade (β = -.029, p = .42). Additional analyses were conducted to test the interaction between attention and caregiver beliefs in the 1st

grade and in block 5 ($F_{(7, 870)} = 15.515$, $p = .43$, $R^2 = .111$) results showing the interaction as non-significantly explaining less than 1% of additional variance in phonetics scores in the 1st grade ($\beta = .026$, $p = .43$). Additionally, the interaction between attention and home environment ($F_{(8, 869)} = 13.782$, $p = .21$, $R^2 = .113$) was not a significant contribution to phonetics achievement in the 1st grade, as the interaction explained less than 1% of additional variance in phonetics achievement in the 1st grade ($\beta = .05$, $p = .21$).

CHAPTER 4

DISCUSSION

In this study I examined the achievement outcomes of children as an artifact of the moderating relationship of proximal influences (parenting, home environment) and temperament (activity, attention), with a specific focus on the interaction of parenting behaviors, and home environment on children's temperamental activity, and attention and how this affects achievement outcomes. Results revealed four main findings. First, children's attention was significantly associated with achievement outcomes. Second, parenting beliefs were only found to be significantly associated with outcomes in the 1st grade. Third, research revealed a significant association between the home environment and children's achievement outcomes. Finally, the interaction effects between proximal influences (parenting beliefs, home environment) and children's temperament had no significant effect on their outcomes. Each finding is discussed in greater detail.

Role of temperament

First, indices of children's difficult temperament rated at 4-and-a-half years, assessed as attention and activity, were significantly correlated with concurrent reading and mathematics achievement positively (for attention) and negatively (for activity), and associated with reading, mathematics achievement positively (for attention) and negatively (for activity), in the 1st grade. In the model, only attention focusing was significantly associated with achievement. It was hypothesized that children who have low attention and high activity levels will perform poorer on achievement measures. Due to the rather stable nature of temperament, it was expected that the resultant poor performance in achievement will continue in subsequent grades (1st grade). Children in our sample whose parents rated them high in attention at 4-and-a-half years indeed demonstrated higher reading and mathematics achievement, and also demonstrated higher reading and mathematics, and phonics achievement in the 1st grade. This finding is comparable to previous research exploring the relationships between child temperament and measures of academic achievement, showing consistent patterns of children who are temperamentally more active, and less attentive as scoring lower on measures of achievement (Coplan et al., 1999; Martin, 1989; Moller, 1983; Pullis & Caldwell, 1982). In addition, children higher in activity had poorer achievement results, but this relationship weakened over time. It was found that the strength of the relationship between activity and achievement was considerably stronger at 4-and-a-half years than it was when the children were in the 1st grade. This downward shift in the relationship between activity and achievement as children develop may be understood in the context of temperamental stability. This may be due to the child's ability to display resilient behaviors, or the ability to regulate certain activities while in the formal learning environment with age, or the context in which activity is displayed. For example, some have reported two

factors of activity, modulation and vigor (Strelau & Zawadzki, 2012). Modulation is the regulatory component of activity and previous research has supported the notion that as children age, their activity level begins to correlate with their ability to adjust and regulate their activity (Zawadzki & Strelau, 1997). This ability to adjust moves behaviors from being disruptive to beneficial, particularly within the formal learning environment. According to Strelau and Zawadzki (2012), activity is not only about physical movement but a method to explore surroundings, be close to peers and relatives and implement avoidance behaviors around strangers, stay away from dangerous activities and disruptive actions, and importantly lead children to be successful contributors to the classroom. However, as children age, higher levels of activity are less acceptable in formal learning environments. Such displays of high activity can indeed be indicative of low inhibitory control or poor behavior regulation (Rudasill, Gallagher, & White, 2010).

Role of parenting beliefs

Second, I expected parenting to significantly influence children's achievement outcomes at 4-and-a-half years and the 1st grade. Results from this study showed that parenting was significantly related to achievement outcomes in the 1st grade, but not at 4-and-a-half years. This is in direct contrast with previous research showing a significant contribution from parenting to children's outcomes across time (Alexander, Entwisle, & Bedinger, 1994; Conger et al., 2002; Gallagher & Kelley, 2008; Mistry, Vaderwater, Houston, & McLoyd, 2002; Sheffield, Morris, et al., 2007). For example, Gallagher and Kelley (2008), found that children's ability to adjust and succeed within the formal learning environment was related to the mothers' ability to display sensitive, warm, and autonomy-supportive parenting, especially for children who were temperamentally difficult. However, previous studies have not included parents' values and

attitudes (e.g., belief in strict discipline for children) as was used in this research, but instead used broad dimensions of parenting (e.g., rejection and control) (McLeod, Wood, & Weisz, 2007), and when assessed with children with difficult temperaments (e.g., fear, anger, negative reactivity), the results were consistent in showing parenting behaviors that are higher in quality and sensitivity resulting in their children's positive achievement outcomes (Pluess & Belsky, 2010).

Role of the home environment

Third, consistent with previous research, I found that the role of the home environment was a substantial predictor of the achievement outcomes in children at 4-and-a-half years and in the 1st grade across all measures of achievement. (Bradley, Corwyn, Burchinal, et al., 2001; Foster et al., 2005; Josefsson, Jokela, Hintsanen et al., 2013; Yeo, Ong & Ng, 2014). Indeed longitudinal research shows that home environment was significantly related to cognitive development and achievement outcomes, such that children living in homes with high quality learning materials, language and academic stimulation, a variety of activities, a clean and less chaotic phsycial environment, parents who were responsive to the needs of children and modeled appropriate behaviors and displayed acceptance had higher early literacy, and numeracy skills in preschool (Hartas, 2011; Sammons et al., 2015; Skwarchuk, 2009), and better subsequent achievement outcomes including development of advanced language and vocabulary (Rodriguez & Tamis-LeMonda, 2011; Son & Morrison, 2010). In addition, the results did not reveal a unique role for the home environment, but it did bolster findings from previous work and the belief that the home environment is an essential part of children's microsystem and correlates significantly with cognitive outcomes (Bradley & Caldwell, 1976; Bradley & Caldwell, 1979).

Interactions (temperament x home, temperament x parenting)

Fourth, the cornerstone of this research was the expectation that supportive parenting and home environments moderate the effects of low attention and high activity levels on children's early achievement outcomes. However, my results provided no support for this hypothesis. That is, the effect of difficult temperament on achievement outcomes was not dependent on aspects of parenting or the home environment that were included here. The lack of an interaction should not be taken to mean that the home environment and parenting are non-impactful components of children's developmental pathways, but that their moderating roles in the relationship between temperament (activity and attention) and achievement outcomes (reading, mathematics) were unfounded. These findings are incongruent with prior work showing the significant moderating effects of the home environment and parenting on behavioral and achievement outcomes of children (Bradley, Burchinal, & Casey, 2001; Lemery-Chalfant, Kao, Swann, & Goldsmith, 2013; McLeod, Wood, & Wise, 2007). Previous research where significant interaction effects emerged included behaviors (e.g., home environment x anxiety, parenting x anger) outside those used in this study (e.g., activity, attention). Also, in the current study specific aspects of the home environment, such as level of chaos, quality of the physical environment which are regularly associated with child outcomes could have been used rather than taking the total home scores as a moderator. In addition, consistent with previous research, parenting could have been examined in this study with behaviors, such as harsh parenting, positive control, negative control, maternal warmth, or maternal sensitivity (McLeod, Wood, & Weisz, 2007). Altogether these specific methods have been shown when combined with temperament to lead to significant interaction effects (Karreman, et al., 2010; Bradley & Corwyn, 2008).

Results reported here support a better understanding of how young children's temperament, primarily activity level and attentional focusing, is related to their achievement outcomes. In addition, results point to the need to examine other temperamental traits (e.g., negative emotionality, shyness, anger) that may be associated with difficult temperament and how these traits are related to achievement, and if proximal factors such as home environment and parenting moderate those trait displays. Future research could use additional temperament traits in combination with proximal influences to examine how those influences moderate the effect of additional difficult behaviors on children's achievement.

Strengths & Limitations

Several limitations require mention. First, this sample does have diversity limitations; for example the study included similar numbers of males and females (705 = male, 659 = female), but did not include large numbers of non-European-American ethnicities (Am Indian = 5, Asian = 22, Black = 176, White = 1097, 64 = Other/Hispanic). Second, temperament assessments of children are generally provided by the mother and though the agreement rate is high between primary and secondary caregivers, and the accuracy of the ratings are also identified as high (Rothbart & Bates, 2006), the overall measurement of child temperament could be strengthened with the reports by paternal figures. Third, our assessment of academic achievement was completed at 4-and-a-half years and in the 1st grade, but not in kindergarten. This could omit valuable continuous information that could help strengthen the understanding of the role parenting and the home environment have in achievement, and also the role it plays in ameliorating risks of low attention and high activity over a specified time frame. Fourth, effect sizes (e.g., R^2) for the moderating roles of parenting and the home environment on temperament at 4-and-a-half years and in the 1st grade in all models were small, again this may be the

consequence of the constructs used for temperament and parenting. Fifth, measures of temperament and 1st grade achievement, and measures of home environment and 1st grade achievement were not completed concurrently. The temperament scores were gathered at 4-and-a-half years, and though temperament displays are widely regarded as stable (Rimm-Kaufman & Kagan, 2005), it may have been useful for assessments to have occurred as the children entered various grades, accounting for the change in environments. This is also the case with the HOME scores being gathered at 4-and-a-half years, this assessment would have yielded valuable information if scores would have coincided with the various grades possibly showing the ongoing strength of the home environment on achievement outcomes of the children in the study. Also, using the HOME scales individual measures rather than the total score could reveal valuable information on specific aspects of the home environment that may indeed prove to be more salient in achievement outcomes and as a moderator to temperamental displays.

Strengths of this study included the large sample and the diversity of the instruments used to assess parenting beliefs, and the use of the H.O.M.E assessments. Also, the simultaneous use of proximal factors (e.g., parenting x temperament, home environment x temperament) is used to assess the strength of such relationships and their continued effect on development. This provides an opportunity to address a litany of questions regarding caregiving, the home environment, and child temperament and how these factors contribute to the child's long term achievement.

Chapter 5

Implications and Future Directions

Results from this study reveal that temperament is a complex and dynamic biological expression that every child displays in reaction to certain environmental stimuli. This expression is a substantial predictor of the child's ability to regulate behaviors, attend properly, build quality and long-lasting relationships, and thrive academically. This research helps promote the understanding of how biological and environmental factors work in concert to produce significant outcomes, both adverse and positive within the child's life. Supportive home environments and parenting beliefs that support autonomy are needed to effectively lead children with temperamental displays (high activity, low attention) that may be adverse to proper academic development.

The current study targeted a fraction of the potential factors that can contribute to a child's academic achievement. The ultimate goal was to substantiate the role of parenting and the home environment as moderators of the achievement outcomes of children with difficult temperament displays. In contrast to the proposed findings, the moderating role of the home environment and parenting was non-significant; instead the results indicate that home environments high in total H.O.M.E scores positively predicted children's achievement scores. Parenting beliefs in the 1st grade were also positive predictors of achievement outcomes. Previous research addressed whether this relationship between early home environment experiences and achievement outcomes was due to the early experience or if indeed it was a product of the consistency of the children's home environments (Bradley, Caldwell, & Elardo, 1977; Gottfried & Gottfried, 1986; Johnson, Breckenridge, & McGowan, 1984), the results show that it is the early experience of the home environment that is significant in achievement outcomes. Though this research was not extensively longitudinal in nature, it was evident that

the strength of the home environment did remain significant at 4-and-a-half years and in the 1st grade, also supporting the belief that consistency in the home environment can indeed foster high achievement outcomes. Findings reported here and elsewhere (references) suggest that interventions for the home environment that target modification of home routines, structures, and interactions to support specific temperament, such as high activity or low attention may be helpful for improving young children's academic development and success.. It is critical to provide caregivers with appropriate knowledge on how to regulate their home environments to provide a structure that is safe and accommodating to the biological factors of their children.

In addition, results from the current study indicate that programs that provide education to parents on effective strategies for working with children who have different temperaments, especially those that are seen as difficult or challenging, may be an effective tool for instilling parental confidence, reducing stress, improving the parent-child relationship. In the end these parenting tools may help children's achievement trajectories as it is generally agreed upon that parents' cognitive and social skills enable them to choose how they will respond to their children and in consequence shape some external behaviors (Collins, Maccoby, Steinberg, Hetherington, & Bornstein, 2000).

Findings from this study from this study point to the importance of considering parenting beliefs beyond the notion of "traditional" or "progressive." Behaviors such as controlling vs. non-controlling, and warm and supportive should be consistently considered as they may affect children differently, particularly when considering interactions with specific difficult temperament traits; this may provide a clearer role of the potential moderating effects of parenting behaviors on difficult temperament and how that may affect children's achievement outcomes. In addition, future research should include consideration of the role of culture and its

influence on parenting and the home environment, and the extent to which it affects the child's temperament displays. Past research has considered some cultural contributions with minimal research focusing on cultural variations within the U.S. (e.g., African-American, Hispanic groups). It may be prudent to understand how temperament characteristics are associated with other culturally relevant variables, and the developmental outcomes to which they lead. A continued focus on proximal and biological contributors to the development of the child provides an exciting realization that there are many opportunities to add on to previous research to account for factors that are salient to the temperamental and academic development of the child.

REFERENCES

Abidin, R. R. (1992). The determinants of parenting behavior. *Journal of Clinical Child Psychology*, *21*(4), 407-412.

Aiken, L.S., & West, S.G. (1991). *Multiple regression: Testing and interpreting interactions.* Newbury Park, CA: Sage.

Ainsworth, M. D., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of attachment: A psychological study of the strange situation. Assessed in the strange situation and at home*. Hillsdale, NJ: Erlbaum.

Anders, Y., Rossbach, H. G., Weinert, S., Ebert, S., Kuger, S., Lehrl, S., & Von Maurice, J. (2012). Home and preschool learning environments and their relations to the development of early numeracy skills. *Early Childhood Research Quarterly*, *27*(2), 231-244.

Aunola, K., & Nurmi, J. E. (2005). The role of parenting styles in children's problem behavior. *Child Development*, *76*(6), 1144-1159.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of personality and social psychology*, *51*(6), 1173.

Bates, J. E., Schermerhorn, A. C., & Petersen, I. T. (2012). Temperament and parenting in developmental perspective. In M. Zentner & R. Shiner (Eds.), *Handbook of Temperament* (pp. 425-441). New York: The Guilford Press.

Baumrind, D. (1991). The influence of parenting style on adolescent competence and substance use. *The Journal of Early Adolescence*, *11*(1), 56-95.

Belsky, J., Bakermans-Kranenburg, M. J., & Van IJzendoorn, M. H. (2007). For better and for worse differential susceptibility to environmental influences. *Current Directions in Psychological Science*, *16*(6), 300-304.

Bernier, A., Carlson, S. M., Deschênes, M., & Matte- Gagné, C. (2012). Social factors in the development of early executive functioning: a closer look at the caregiving environment. *Developmental Science*, *15*(1), 12-24.

Birch, S. H., & Ladd, G. W. (1998). Children's interpersonal behaviors and the teacher–child relationship. *Developmental Psychology*, *34*(5), 934.

Blair, C., & Razza, R. P. (2007). Relating effortful control, executive function, and false belief understanding to emerging math and literacy ability in kindergarten. *Child Development*, *78*(2), 647-663.

Bornstein, M. H., & Tamis-LeMonda, C. S. (1989). Maternal responsiveness and cognitive development in children. In M. H. Bornstein (Ed.), *Maternal responsiveness: Characteristics and consequences. New directions for child development* (Vol. 43, pp. 49–61). San Francisco: Jossey-Bass.

Bradley, R. (1994). The HOME Inventory: Review and reflections. In H. Reese (Ed.), *Advances in child development and behavior* (pp. 241-288). San Diego, CA; Academic Press.

Bradley, R. H., Caldwell, B. M., & Elardo, R. (1977). Home environment, social status, and mental test performance. *Journal of educational psychology*, *69*(6), 697.

Bradley, R. H., & Corwyn, R. F. (2002). Socioeconomic status and child development. *Annual review of psychology*, *53*(1), 371-399.

Bradley, R. H., & Corwyn, R. F. (2008). Infant temperament, parenting, and externalizing behavior in first grade: A test of the differential susceptibility hypothesis. *Journal of Child Psychology and Psychiatry*, *49*(2), 124-131.

Bradley, R. H., Corwyn, R. F., Burchinal, M., McAdoo, H. P., & García-Coll, C. (2001). The home environments of children in the United States Part II: Relations with behavioral development through age thirteen. *Child development*, *72*(6), 1868-1886.

Bramlett, R. K., Scott, P., & Rowell, R. K. (2000). A comparison of temperament and social skills in predicting academic performance in first graders. *Special Services in the Schools*, *16*(1-2), 147-158.

Bratsch-Hines, M. E., Vernon-Feagans, L., & Family Life Project Key Investigators. (2013). Childcare changes, home environment quality, and the social competence of African American children at age 3. *Early Education & Development*, *24*(8), 1065-1081.

Bronfenbrenner, U. (1995). Developmental ecology through space and time: A future perspective. *Examining lives in context: Perspectives on the ecology of human development*, *619*-647.

Bronfenbrenner, U., & Ceci, S. J. (1994). Nature-nurture reconceptualized in developmental perspective: A bioecological model. *Psychological review, 101*(4), 568.

Bronfenbrenner, U., & Morris, P. A. (2006). The bioecological model of human development. *The bioecological model of human development.* IN RM Lerner W. Damon (Eds.), *Handbook of child psychology: Vol. 1. Theoretical models of human development* (6th ed., pp. 793-828). New York, NY: Wiley.

Burnette, M. L., Oshri, A., Lax, R., Richards, D., & Ragbeer, S. N. (2012). Pathways from harsh parenting to adolescent antisocial behavior: A multidomain test of gender moderation. *Development and psychopathology*, *24*(03), 857-870.

Buss, (1989) Temperaments as personality traits. In G. A. Kohnstamm, 3. E. Bates, & M.K. Rothbart (Eds.). *Handbook of Temperament in Childhood*. (pp. 49-58). New York: Wiley

Caldas, S. J., & Bankston, C. (1997). Effect of school population socioeconomic status on individual academic achievement. *The Journal of Educational Research*, *90*(5), 269-277.

Caspi, A., & Silva, P. A. (1995). Temperamental qualities at age three predict personality traits in young adulthood: Longitudinal evidence from a birth cohort. *Child development*, *66*(2), 486-498.

Lemery-Chalfant, K., Kao, K., Swann, G., & Goldsmith, H. H. (2013). Childhood temperament: Passive gene–environment correlation, gene–environment interaction, and the hidden importance of the family environment. *Development and psychopathology*, *25*(01), 51-63.

Chess, S., & Thomas, A. (1999). *Goodness of fit: Clinical applications from infancy through adult life*. Psychology Press.

Collins, W. A., Maccoby, E. E., Steinberg, L., Hetherington, E. M., & Bornstein, M. H. (2000). Contemporary research on parenting: the case for nature and nurture. *American Psychologist, 55*(2), 218.

Conger, R. D., & Donnellan, M. B. (2007). An interactionist perspective on the socioeconomic context of human development. *Annual Review of Psychology., 58*, 175-199.

Conger R.D., Elder G.H., Jr. (1994) Families in troubled times: Adapting to change in rural America. New York: Aldine.

Conger, R.D., Conger, K.J., Elder, G.H.J., Lorenz, F.O., Simons, R.L., & Whitbeck, L.B. (1993). Family economic stress and adjustment of early adolescent girls. *Developmental Psychology, 29*, 206–219.

Conger, R. D., Wallace, L. E., Sun, Y., Simons, R. L., McLoyd, V. C., & Brody, G. H. (2002). Economic pressure in African American families: a replication and extension of the family stress model. *Developmental Psychology, 38*(2), 179.

Coplan, R. J., Barber, A. M., & Legacè-Seguin, D. G. (1999). The role of child temperament as a predictor of early literacy and numeracy skills in preschoolers. *Early Childhood Research Quarterly*, 14, 537-553.

Coplan, R. J., Bowker, A., & Cooper, S. M. (2003). Parenting daily hassles, child temperament, and social adjustment in preschool. *Early Childhood Research Quarterly*, *18*(3), 376-395.

Crosnoe, R., Leventhal, T., Wirth, R. J., Pierce, K. M., & Pianta, R. C. (2010). Family socioeconomic status and consistent environmental stimulation in early childhood. *Child Development*, *81*(3), 972-987.

Davis-Kean, P. E. (2005). The influence of parent education and family income on child achievement: the indirect role of parental expectations and the home environment. *Journal of Family Psychology*, *19*(2), 294-304.

Deater-Deckard, K., & Scarr, S. (1996). Parenting stress among dual-earner mothers and fathers: Are there gender differences? *Journal of Family Psychology*, *10*(1), 45-59.

Degnan, K. A., Almas, A. N., & Fox, N. A. (2010). Temperament and the environment in the etiology of childhood anxiety. *Journal of Child Psychology and Psychiatry*, *51*(4), 497-517.

Denham S.A., Workman E., Cole P.M., Weissbrod C., Kendziora K.T., Zahn-Waxler C. (2000). Prediction of externalizing behavior problems from early to middle childhood: The role of parental socialization and emotion expression. *Development and Psychopathology*, *12*, 23–45.

Dennis, T. (2006). Emotional self-regulation in preschoolers: The interplay of child approach reactivity, parenting, and control capacities. *Developmental Psychology*, *42*(1), 84-97.

Denton, K., & West, J. (2002). Children's reading and mathematics achievement in kindergarten and first grade.

Diamond, A. (2013). Executive functions. *Annual review of psychology*, *64*, 135-168.

Duckworth, A. L., & Allred, K. M. (2012). Temperament in the classroom. *Handbook of Temperament (627-644). New York: Guilford*.

Dumas J.E., Nissley J., Nordstrom A., Phillips Smith E., Prinz R.J., Levine D.W. (2005). Home chaos: Sociodemographic, parenting, interactional, and child correlates. *Journal of Clinical Child and Adolescent Psychology 34*, 93–104.

Duncan, G. J., & Magnuson, K. A. (2003). Off with Hollingshead: Socioeconomic resources, parenting, and child development. *Socioeconomic status, parenting, and child development*, 83-106.

Duncan, G. J., & Magnuson, K. A. (2005). Can family socioeconomic resources account for racial and ethnic test score gaps? *The future of children*, *15*(1), 35-54.

Duncan, G. J., Brooks‐Gunn, J., & Klebanov, P. K. (1994). Economic deprivation and early childhood development. *Child development*, *65*(2), 296-318.

Duncan, G. J., Yeung, W. J., Brooks-Gunn, J., & Smith, J. R. (1998). How much does childhood poverty affect the life chances of children? *American Sociological Review*, 406-423.

Duncan, G. J., Ziol- Guest, K. M., & Kalil, A. (2010). Early- Childhood Poverty and Adult Attainment, Behavior, and Health. *Child Development*, *81*(1), 306-325.

Eisenberg, N., Fabes, R. A., Bernzweig, J., Karbon, M., Poulin, R., & Hanish, L. (1993). The relations of emotionality and regulation to preschoolers' social skills and sociometric status. *Child Development*, *64*, 1418–1438.

Else-Quest, N. M., Hyde, J. S., Goldsmith, H. H., & Van Hulle, C. A. (2006). Gender differences in temperament: a meta-analysis. *Psychological Bulletin, 132*(1), 33-72.

Entwisle, D. R., Alexander, K. L., & Olson, L.S. (1997). *Children, Schools, and Inequality.* Boulder, CO: Westview Press.

Evans, G.W., Eckenrode, J., & Marcynyszyn, L. A. (2010). Chaos and the macrosetting: The role of poverty and socioeconomic status. In G.W. Evans & T.D. Wachs (Eds.). *Chaos and its influence on children's development: An ecological perspective* (pp. 225-238). Washington, DC: American Psychological Association.

Fabes, R. A., & Martin, C. L. (1991). Gender and age stereotypes of emotionality. *Personality and Social Psychology Bulletin*, (17), 532-540.

Fairchild, A. J., & MacKinnon, D. P. (2009). A general model for testing mediation and moderation effects. *Prevention Science*, *10*(2), 87-99.

Foster, et al., (2005)

Gartstein, M. A., & Rothbart, M. K. (2003). Studying infant temperament via the revised infant behavior questionnaire. *Infant Behavior and Development*, *26*(1), 64-86.

Gottfried, A. W., & Gottfried, A. E. (1986). Home environment and children's development from infancy through the school entry years: Results of contemporary longitudinal investigations in North America. *Children's Environments Quarterly*, 3-9.

Gottlieb G, Wahlsten D, Lickliter R. (2006). The significance of biology for human development: A developmental psychobiological systems perspective. In: Lerner RM, editor. *Handbook of child psychology: Theoretical models of human development. Vol. 1*. (pp. 210–257). New York: Wiley.

Greenfield, P. (1995). Culture, ethnicity, race, and development: Implications for teaching, theory, and research. *SRCD Newsletter,* pp. 3,4,12.

Guerin, D. W., Gottfried, A. W., Oliver, P. H., & Thomas, C. W. (2003). Temperament: Infancy through adolescence. New York: Kluwer Academic/Plenum.

Guerin, D. W., Gottfried, A. W., & Thomas, C. W. (1997). Difficult temperament and behavior problems: A longitudinal study from 1.5 to 12 years. *International Journal of Behavioral Development, 21*(1), 71-90.

Guo, G., & Harris, K. M. (2000). The mechanisms mediating the effects of poverty on children's intellectual development. *Demography*, *37*(4), 431-447.

Hartas, D. (2011). Families' social backgrounds matter: socio-economic factors, home learning and young children's language, literacy and social outcomes. *British Educational Research Journal*, *37*(6), 893-914.

Haveman, R., & Wolfe, B. (1995). The determinants of children's attainments: A review of methods and findings. *Journal of Economic Literature*, 1829-1878.

Hecht, S. A., & Greenfield, D. B. (2002). Explaining the predictive accuracy of teacher judgments of their students' reading achievement: The role of gender, classroom behavior, and emergent literacy skills in a longitudinal sample of children exposed to poverty. *Reading and Writing, 15*(7-8), 789-809.

Hoff, E., Laursen, B., & Tardif, T. (2002). Socioeconomic status and parenting. In M. H. Bornstein (Ed.), *Handbook of parenting* (2nd ed., pp. 231–252). Mahwah, NJ: Erlbaum.

Hoffman, L. W. (2003). Methodological issues in studies of SES, parenting, and child development. In M. Bornstein, & R. Bradley (Eds.). *Socioeconomic status, parenting, and child development* (pp. 125-143). Mahwah, N.J: Erlbaum.

Hudson, J. L., Dodd, H. F., Lyneham, H. J., & Bovopoulous, N. (2011). Temperament and family environment in the development of anxiety disorder: two-year follow-up. *Journal of the American Academy of Child & Adolescent Psychiatry, 50*(12), 1255-1264.

Jansen, P. W., Raat, H., Mackenbach, J. P., Jaddoe, V. W., Hofman, A., Verhulst, F. C., & Tiemeier, H. (2009). Socioeconomic inequalities in infant temperament. *Social Psychiatry and Psychiatric Epidemiology, 44*(2), 87-95.

Johnson, D. L., Breckenridge, J. N., & McGowan, R. J. (1984). Home environment and early cognitive development in Mexican-American children. *Home environment and early cognitive development: Longitudinal research*, 151-196.

Jokela, M., & Keltikangas-Järvinen, L. (2011). The association between low socioeconomic status and depressive symptoms depends on temperament and personality traits. *Personality and Individual Differences*, *51*(3), 302-308.

Justice, L.M., Cottone, E.A., Mashburn, A., and Rimm-Kaufman, S.E. (2008). Relationships Between Teachers and Preschoolers Who Are At Risk: Contribution Of Children's Language Skills, Temperamentally Based Attributes, and Gender. *Early Education and Development, 19(4)*: 600–621.

Kazdin, A. (1987). Treatment of antisocial behavior in childhood: Current status and future directions. *Psychological Bulletin*, 102, 187—203

Keown, L. J. (2012). Predictors of Boys' ADHD Symptoms from Early to Middle Childhood: The Role of Father–Child and Mother–Child Interactions. *Journal of Abnormal Child Psychology*, *40* (4), 569-581

Kiff, C. J., Lengua, L. J., & Bush, N. R. (2011). Temperament variation in sensitivity to parenting: Predicting changes in depression and anxiety. *Journal of Abnormal Child Psychology*, *39*(8), 1199-1212.

Klebanov, M. S., & Travis, A. D. (2014). *The Critical Role of Parenting in Human Development (pp. 22-39)*. New York: Routledge.

Kochanska, G., & Kim, S. (2013). Early attachment organization with both parents and future behavior problems: From infancy to middle childhood. *Child development*, *84*(1), 283-296.

Kochanska, G., Murray, K. T., & Harlan, E. T. (2000). Effortful control in early childhood: continuity and change, antecedents, and implications for social development. *Developmental psychology*, *36*(2), 220-232.

Korenman, S., Miller, J. E., & Sjaastad, J. E. (1995). Long-term poverty and child development in the United States: Results from the NLSY. *Children and Youth Services Review*, *17*(1), 127-155.

Lareau, A. (2003). Unequal childhoods: Race, class and family life. Berkeley: University of California Press

Lengua, L. J., & Wachs, T. D. (2012). Temperament and risk: Resilient and vulnerable responses to adversity. *Handbook of temperament* (pp. 519-540). New York: Guilford.

Loeber, R. (1991). Antisocial behavior: more enduring than changeable? *Journal of the American Academy of Child & Adolescent Psychiatry*, *30*(3), 393-397.

MacKinnon, D. P., & Fairchild, A. J. (2009). Current directions in mediation analysis. *Current Directions in Psychological Science*, *18*(1), 16-20.

Malecki, C. K., & Demaray, M. K. (2006). Social support as a buffer in the relationship between socioeconomic status and academic performance. *School Psychology Quarterly*, *21*(4), and 363-375.

Martin, R. P. (1994). Child temperament and common problems in schooling: Hypotheses about causal connections. *Journal of School Psychology*, *32*(2), 119-134.

McClelland, M. M., Acock, A. C., & Morrison, F. J. (2006). The impact of kindergarten learning-related skills on academic trajectories at the end of elementary school. *Early Childhood Research Quarterly*, *21*(4), 471-490.

McClelland, M. M., Cameron, C. E., Connor, C. M., Farris, C. L., Jewkes, A. M., & Morrison, F. J. (2007). Links between behavioral regulation and preschoolers' literacy, vocabulary, and math skills. *Developmental psychology*, *43*(4), 947.

McClelland, M. M., Morrison, F. J., & Holmes, D. L. (2000). Children at risk for early academic problems: The role of learning-related social skills. *Early childhood research quarterly*, *15*(3), 307-329.

McLeod, B. D., Weisz, J. R., & Wood, J. J. (2007). Examining the association between parenting and childhood depression: A meta-analysis. *Clinical psychology review*, *27*(8), 986-1003.

McLoyd, V. C. (1998). Socioeconomic disadvantage and child development. *American psychologist*, *53*(2), 185-204.

Mead, M. (1935). Sex and temperament.

Meece, J. L. (2002). *Child & Adolescent Development for Educators* (2nd Edition). New York: McGraw Hill.

Metcalfe, L. A., Harvey, E. A., & Laws, H. B. (2013). The longitudinal relation between academic/cognitive skills and externalizing behavior problems in preschool children. *Journal of educational psychology*, *105*(3), 881-894.

Molfese, V. J., DiLalla, L. F., & Bunce, D. (1997). Prediction of the intelligence test scores of 3-to 8-year-old children by home environment, socioeconomic status, and biomedical risks. *Merrill-Palmer Quarterly (1982-)*, 219-234.

Molfese, V. J., Rudasill, K. M., Beswick, J. L., Jacobi-Vessels, J. L., Ferguson, M. C., & White, J. M. (2010). Infant temperament, maternal personality, and parenting stress as contributors to infant developmental outcomes. *Merrill-Palmer Quarterly*, *56*(1), 49-79.

Montirosso, R., Cozzi, P., Putnam, S. P., Gartstein, M. A., & Borgatti, R. (2010). Studying cross-cultural differences in temperament in the first year of life: United States and Italy. *International Journal of Behavioral Development 36*(3), 480-483.

Muris, P., Merckelbach, H., Schmidt, H., Gadet, B., & Bogie, N. (2001). Anxiety and depression as correlates of self-reported behavioral inhibition in normal adolescents. *Behavior Research and Therapy*, *39*(9), 1051-1061.

Nelson, B., Martin, R. P., Hodge, S., Havill, V. & Kamphus, R. (1999) Modeling the prediction of elementary school adjustment from preschool temperament, *Personality and Individual Differences, 26,* 687–700.

Noble, K. G., Norman, M. F., & Farah, M. J. (2005). Neurocognitive correlates of socioeconomic status in kindergarten children. *Developmental science, 8*(1), 74-87.

Noel, M., Peterson, C., & Jesso, B. (2008). The relationship of parenting stress and child temperament to language development among economically disadvantaged preschoolers. *Journal of Child Language, 35*(04), 823-843.

Okpala, C. O., Smith, F., Jones, E., & Ellis, R. (2000). A clear link between school and teacher characteristics, student demographics, and student achievement. *Education, 120*(3), 487-500.

Olson, S. L., Bates, J. E., Sandy, J. M., & Lanthier, R. (2000). Early developmental precursors of externalizing behavior in middle childhood and adolescence. *Journal of abnormal child psychology, 28*(2), 119-133.

Patterson, G. R., DeBaryshe, B. D., & Ramsey, E. (1989). A developmental perspective on antisocial behavior. *American Psychological Association.44 (2),* 329-335.

Paulussen-Hoogeboom, M. C., Stams, G. J. J., Hermanns, J., & Peetsma, T. T. (2007). Child negative emotionality and parenting from infancy to preschool: A meta-analytic review. *Developmental Psychology, 43*(2), 438.

Price, J. M., Chiapa, A., & Walsh, N. E. (2013). Predictors of externalizing behavior problems in early elementary-aged children: The role of family and home environments. *The Journal of genetic psychology, 174*(4), 464-471.

Propper, C., & Moore, G. A. (2006). The influence of parenting on infant emotionality: A multi-level psychobiological perspective. *Developmental Review, 26*(4), 427-460.

Pungello, E. P., Kainz, K., Burchinal, M., Wasik, B. H., Sparling, J. J., Ramey, C. T., & Campbell, F. A. (2010). Early Educational Intervention, Early Cumulative Risk, and the Early Home Environment as Predictors of Young Adult Outcomes Within a High- Risk Sample. *Child development, 81*(1), 410-426.

Putnam, S. P., Sanson, A., & Rothbart, M. K. (2002). Child temperament and parenting. In M. Bornstein (Ed.) *Handbook of Parenting, 2nd Edition* (Volume 1, pp. 255-278). Mahwah, NJ: Erlbaum.

Ram, B., & Hou, F. (2003). Changes in family structure and child outcomes: Roles of economic and familial resources. *Policy Studies Journal*, *31*(3), 309-330.

Ramey, C. T., & Ramey, S. L. (2004). Early learning and school readiness: Can early intervention make a difference? *Merrill-Palmer Quarterly*, *50*(4), 471-491.

Rijlaarsdam, J., Stevens, G. W., van der Ende, J., Hofman, A., Jaddoe, V. W., Mackenbach, J. P., Verhulst, F.C., & Tiemeier, H. (2013). Economic disadvantage and young children's emotional and behavioral problems: mechanisms of risk. *Journal of abnormal child psychology*, *41*(1), 125-137.

Rimm-Kaufman, S. E., & Kagan, J. (2005). Infant predictors of kindergarten behavior: The contribution of inhibited and uninhibited temperament types. *Behavioral Disorders,* 331-347.

Robinson, C., Mandleco, B., Oslen, S. F., & Hart, C. H. (1995). Authoritative, authoritarian, and permissive parenting practices: Development of a new measure. *Psychological Reports, 77,* 819-830

Rodriguez, C. M., & Green, A. J. (1997). Parenting stress and anger expression as predictors of child abuse potential. *Child Abuse & Neglect*, *21*(4), 367-377.

Roskam, I., Stievenart, M., Meunier, J. C., & Noël, M. P. (2014). The development of children's inhibition: Does parenting matter? *Journal of experimental child psychology, 122*, 166-182.

Rothbart, M. K., Ahadi, S. A., & Hershey, K. L. (1994). Temperament and social behavior in childhood. *Merrill-Palmer Quarterly (1982-)*, 21-39.

Rothbart, M., & Bates, J. (2006). Temperament. In N. Eisenberg, W. Damon, & L. M. Richard (Eds.), *Handbook of child psychology: Vol. 3, Social, emotional, and personality development (6th ed.)* (pp. 99-166). Hoboken, NJ US: John Wiley & Sons Inc.

Rothbart, M. K., & Derryberry, D. (1981). Development of individual differences in temperament. In M.E. Lamb & A.L. Brown (Eds.). *Advances in developmental psychology (Vol. 1, pp. 37-86).* Hillsdale, NJ: Erlbaum.

Rothbart, M. K., & Jones, L. B. (1998). Temperament, self-regulation, and education. *School Psychology Review, 27*, 479-491.

Rothbart, M.K. & Posner, M.I. (2005). Genes and experience in the development of executive attention and effortful control. In L.A. Jensen & R.W. Larson (Eds). *New horizons in developmental theory and research* (p.101-108). San Francisco: Jossey-Bass

Rudasill, K. M., Gallagher, K. C., & White, J. M. (2010). Temperamental attention and activity, classroom emotional support, and academic achievement in third grade. *Journal of School Psychology*, *48*(2), 113-134.

Rudasill, K. M., & Rimm-Kaufman, S. E. (2009). Teacher–child relationship quality: The roles of child temperament and teacher–child interactions. *Early Childhood Research Quarterly, 24*(2), 107-120.

Rudasill, K. M., Reio, T. G., Stipanovic, N., & Taylor, J. E. (2010). A longitudinal study of student–teacher relationship quality, difficult temperament, and risky behavior from childhood to early adolescence. *Journal of School Psychology*, *48*(5), 389-412.

Rueda, M. R., Rothbart, M. K., McCandliss, B. D., Saccomanno, L., & Posner, M. I. (2005). Training, maturation, and genetic influences on the development of executive attention. *Proceedings of the national Academy of Sciences of the United States of America*, *102*(41), 14931-14936.

Sameroff, A. J., Seifer, R., & Elias, P. K. (1982). Sociocultural variability in infant temperament ratings. *Child Development*, 164-173.

Sanson, A. V., Smart, D. F., Prior, M., Oberklaid, F., & Pedlow, R. (1994). The structure of temperament from age 3 to 7 years: Age, sex, and sociodemographic influences. *Merrill-Palmer Quarterly (1982-)*, 233-252.

Sethi, A., Mischel, W., Aber, J. L., Shoda, Y., & Rodriguez, M. L. (2000). The role of strategic attention deployment in development of self-regulation: Predicting preschoolers' delay of gratification from mother–toddler interactions. *Developmental Psychology*, *36*(6), 767-777.

Silverman, I. W. (2003). Gender differences in delay of gratification: A meta-analysis. *Sex Roles, 49*, 451–463.

Singer, S. L., Stefflre, B., & Thompson, F. W. (1958). Temperament scores and socioeconomic status. *Journal of Counseling Psychology*, *5*(4), 281.

Skwarchuk, S. L., Sowinski, C., & LeFevre, J. A. (2014). Formal and informal home learning activities in relation to children's early numeracy and literacy skills: The development of a home numeracy model. *Journal of experimental child psychology*, *121*, 63-84.

Sohr- Preston, S. L., Scaramella, L. V., Martin, M. J., Neppl, T. K., Ontai, L., & Conger, R. (2013). Parental Socioeconomic Status, Communication, and Children's Vocabulary Development: A Third- Generation Test of the Family Investment Model. *Child development*, *84*(3), 1046-1062.

Steinberg, L. (2001). We know some things: Parent–adolescent relationships in retrospect and prospect. *Journal of research on adolescence*, *11*(1), 1-19.

Steinberg, L., Lamborn, S. D., Darling, N., Mounts, N. S., & Dornbusch, S. M. (1994). Over- time changes in adjustment and competence among adolescents from authoritative, authoritarian, indulgent, and neglectful families. *Child development*, *65*(3), 754-770.

Stevenson, J. (1992). Evidence for a genetic etiology in hyperactivity in children. *Behavior Genetics*, *22*(3), 337-344.

Thomas, A., & Chess, S. (1977). Temperament and development. New York: Brunner/Mazel.

Chess, S., & Thomas, A. (1999). The origins of the goodness of fit concept. *Goodness of fit: Clinical applications from infancy through adult life* (10-18). Psychology Press.

Thompson, A., Hollis, C., & Richards, D. (2003). Authoritarian parenting attitudes as a risk for conduct problems: Results from a British national cohort study. *European Child & Adolescent Psychiatry*, 12, 84–91.

Towe-Goodman, N. R., Willoughby, M., Blair, C., Gustafsson, H. C., Mills-Koonce, W. R., & Cox, M. J. (2014). Fathers' sensitive parenting and the development of early executive functioning. *Journal of Family Psychology, 28*(6), 867.

Trentacosta, C. J., Hyde, L. W., Shaw, D. S., Dishion, T. J., Gardner, F., & Wilson, M. (2008). The relations among cumulative risk, parenting, and behavior problems during early childhood. *Journal of Child Psychology and Psychiatry*, *49*(11), 1211-1219.

Valiente, C., Eisenberg, N., Haugen, R. G., Spinrad, T. L., Hofer, C., Liew, J., & Kupfer, A. (2011). Children's effortful control and academic achievement: Mediation through social functioning. *Early Education & Development*, *22*(3), 411-433.

Valiente, C., Lemery- Chalfant, K., & Reiser, M. (2007). Pathways to problem behaviors: Chaotic homes, parent and child effortful control, and parenting. *Social Development*, *16*(2), 249-267

Vernon-Feagans, L., Garrett-Peters, P., Willoughby, M., Mills-Koonce, R., & Family Life Project Key Investigators. (2012). Chaos, poverty, and parenting: Predictors of early language development. *Early childhood research quarterly*, *27*(3), 339-351.

Vygotsky, L. S. (1978). Mind and society: The development of higher mental processes.

White, K. R. (1982). The relation between socioeconomic status and academic achievement. *Psychological Bulletin*, *91*(3), 461-481.

Williams, L. R., Degnan, K. A., Perez-Edgar, K. E., Henderson, H. A., Rubin, K. H., Pine, D. S., Steinberg, L., & Fox, N. A. (2009). Impact of behavioral inhibition and parenting style on internalizing and externalizing problems from early childhood through adolescence. *Journal of abnormal child psychology*, *37*(8), 1063-1075

Wood, J. J., McLeod, B. D., Sigman, M., Hwang, W. C., & Chu, B. C. (2003). Parenting and childhood anxiety: Theory, empirical findings, and future directions. *Journal of child psychology and psychiatry*, *44*(1), 134-151.

Yeo, L. S., Ong, W. W., & Ng, C. M. (2014). The home literacy environment and preschool children's reading skills and interest. *Early Education and Development*, *25*(6), 791-814.

Yeung, W. J., Linver, M. R., & Brooks–Gunn, J. (2002). How money matters for young children's development: Parental investment and family processes. *Child development*, *73*(6), 1861-1879.

Zhou, S., & Yao, K. (1992). The relationship of temperament, environment, and behavioral problems in children age 2-3 years. *Cllirzese Mental Health. 0l (I'Il (1I, 6, 160-163*.

TABLES AND FIGURES

Table I:

Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation
SES	1073	56.86	.10	56.96	3.5899	3.17262
Gender	1364	1	1	2	1.48	.500
WJ-LW(4 ½)	1056	103	63	166	98.93	13.520
WJ-AP(4 ½)	1053	112	41	153	102.94	15.632
WJ-AP 1G	1023	117	46	163	110.80	17.138
WJ-LW 1G	1025	103	51	154	111.99	15.789
WJ-WA 1G	1024	69	76	145	108.37	14.351
AL	1025	5.30	1.60	6.90	4.7860	.75655
AF	1023	5.63	1.25	6.88	4.7064	.85014
HOME	1045	37.00	18.00	55.00	45.9983	5.45698
CG (4 1/12)	769	90.00	30.00	120.00	66.6465	16.98205
CG 1G	1013	84.00	37.00	121.00	73.4175	16.71667
Valid N (listwise)	489					

Note: AL=Activity, AT=Attention, CG=Caregiver beliefs, HM=Home Environment, WJ-LW=Woodcock Johnson Letter Word Identification (4 ½ years), WJ-AP= Woodcock Johnson Applied Problems (4 ½ years), WJ AP 1G= Woodcock Johnson Applied Problems 1st grade, WJ LW 1G= Woodcock Johnson Letter Work Identification 1st grade, WJ-WA = Woodcock Johnson Word Attack 1st grade.

Correlations

Table II

Correlations *at 4 1/2 years with and without SES/Gender as control variables*

Control Variables		WJ-LW	WJ-AP	AF	AL	HOME	Parenting	SES	Gender
-none-[a]	WJ-LW	1.00							
	WJ-AP	.58**	1.00						
	AF	.24**	.32**	1.00					
	AL	-.07	-.10*	-.40**	1.00				
	HOME	.41**	.41**	.34**	-.16**	1.00			
	Parenting	.03	.00	-.01	.03	-.01	1.00		
	SES	.23**	.25**	.14**	-.12**	.33**	-.06	1.00	
	Gender	.02	.07	.15**	-.22**	.02	.09*	.04	1.00
SES/Gender	WJ-LW	1.00							
	WJ-AP	.56**	1.00						
	AF	.21**	.29**	1.00					
	AL	-.04	-.06	-.38**	1.00				
	HOME	.37**	.36**	.32**	-.13**	1.00			
	Parenting	.04	.01	-.02	.04	.01	1.00		

**. Correlation is significant at 0.01 level

*. Correlation is significant at 0.05 level

a. Cells contain zero-order (Pearson) correlations.

Table III:

Correlations at 4 1/2 years with and without gender as a control variable

Control Variables		WJ-LW	WJ-AP	AF	AL	HOME	Parenting	Gender
-none-[a]	WJ-LW	1.00						
	WJ-AP	.59**	1.00					
	AF	.23**	.32**	1.00				
	AL	-.07	-.10*	-.40**	1.00			
	HOME	.41**	.41**	.33**	-.16**	1.00		
	Parenting	.03	.01	-.02	.02	-.01	1.00	
	Gender	.02	.07	.15**	-.23**	.02	.09*	1.00
Gender	WJ-LW	1.00						
	WJ-AP	.59**	1.00					
	AF	.23**	.31**	1.00				
	AL	-.06	-.09*	-.38**	1.00			
	HOME	.41**	.41**	.33**	-.16**	1.00		
	Parenting	.03	.00	-.04	.05	-.01	1.00	

**. Correlation is significant at 0.01 level

*. Correlation is significant at 0.05 level

a. Cells contain zero-order (Pearson) correlations.

Table IV:
Correlations at 4 1/2 years with and without SES as control variable

Control Variables		WJ-LW	WJ-AP	AF	AL	HOME	Parenting	SES
-none-[a]	WJ-LW	1.00						
	WJ-AP	.58**	1.00					
	AF	.24**	.32**	1.00				
	AL	-.07	-.10*	-.40**	1.00			
	HOME	.41**	.41**	.34**	-.16**	1.00		
	Parenting	.03	.00	-.01	.03	-.01	1.00	
	SES	.23**	.25**	.14**	-.12**	.33**	-.06	1.00
SES	WJ-LW	1.00						
	WJ-AP	.56**	1.00					
	AF	.21**	.30**	1.00				
	AL	-.04	-.08	-.39**	1.00			
	HOME	.37**	.36**	.32**	-.13**	1.00		
	Parenting	.05	.02	-.01	.02	.01	1.00	

**. Correlation is significant at 0.01 level

*. Correlation is significant at 0.05 level

a. Cells contain zero-order (Pearson) correlations.

Table V:
Correlations at 1st grade with and without SES/Gender as control variables

Control Variables		WJ-AP 1G	WJ-LW 1G	WJ-AP 1G	AF	AL	HOME	Parenting 1G	SES	Gender
-none-[a]	WJ-AP 1G	1.00								
	WJ-LW 1G	.54**	1.00							
	WJ-WA 1G	.52**	.85**	1.00						
	AF	.24**	.23**	.22**	1.00					
	AL	-.05	-.06	-.02	-.43**	1.00				
	HOME	.35**	.32**	.27**	.35**	-.17**	1.00			
	Parenting 1G	-.30**	-.19**	-.23**	-.28**	.11**	-.42**	1.00		
	SES	.25**	.14**	.13**	.15**	-.10**	.34**	-.30**	1.00	
	Gender	-.08*	.08*	.01	.12**	-.18**	.04	.02	.03	1.00
SES/Gender	WJ-AP 1G	1.00								
	WJ-LW 1G	.54**	1.00							
	WJ-WA 1G	.51**	.84**	1.00						
	AF	.23**	.20**	.20**	1.00					
	AL	-.04	-.03	.00	-.41**	1.00				
	HOME	.30**	.29**	.25**	.32**	-.14**	1.00			
	Parenting 1G	-.25**	-.16**	-.20**	-.26**	.09**	-.36**	1.00		

**. Correlation is significant at 0.01 level

*. Correlation is significant at 0.05 level

a. Cells contain zero-order (Pearson) correlations.

Table VI:
Correlations at 1st grade with and without SES as a control variable

Control Variables		WJ-AP 1G	WJ-LW 1G	WJ-WA 1G	AF	AL	HOME	Parenting 1G	SES
-none-[a]	WJ-AP 1G	1.00							
	WJ-LW 1G	.54**	1.00						
	WJ-WA 1G	.52**	.85**	1.00					
	AF	.24**	.23**	.22**	1.00				
	AL	-.05	-.06	-.02	-.43**	1.00			
	HOME	.35**	.32**	.27**	.35**	-.17**	1.00		
	Parenting 1G	-.30**	-.19**	-.23**	-.28**	.11**	-.42**	1.00	
	SES	.25**	.14**	.13**	.15**	-.10**	.34**	-.30**	1.00
SES	WJ-AP 1G	1.00							
	WJ-LW 1G	.53**	1.00						
	WJ-WA 1G	.50**	.84**	1.00					
	AF	.21**	.21**	.20**	1.00				
	AL	-.02	-.04	.00	-.42**	1.00			
	HOME	.29**	.29**	.25**	.32**	-.15**	1.00		
	Parenting 1G	-.25**	-.16**	-.20**	-.25**	.08*	-.36**	1.00	

**. Correlation is significant at 0.01 level

*. Correlation is significant at 0.05 level

a. Cells contain zero-order (Pearson) correlations.

Table VII:
Correlations at 1st grade with and without gender as control variable

Control Variables		WJ-AP 1G	WJ-LW 1G	WJ-WA 1G	AF	AL	Parenting 1G	HOME	Gender
-none-[a]	WJ-AP 1G	1.00							
	WJ-LW 1G	.54**	1.00						
	WJ-WA 1G	.52**	.85**	1.00					
	AF	.24**	.22**	.21**	1.00				
	AL	-.05	-.06	-.02	-.43**	1.00			
	Parenting 1G	-.30**	-.19**	-.22**	-.28**	.12**	1.00		
	HOME	.35**	.31**	.27**	.34**	-.17**	-.42**	1.00	.
	Gender	-.08*	.08*	.01	.12**	-.19**	.01	.04	1.00
Child's Gender: 1=Male, 2=Female	WJ-AP 1G	1.00							
	WJ-LW 1G	.55**	1.00						
	WJ-WA 1G	.52**	.85**	1.00					
	AF	.25**	.21**	.21**	1.00				
	AL	-.06	-.04	-.02	-.41**	1.00			
	Parenting 1G	-.30**	-.19**	-.22**	-.28**	.12**	1.00		
	HOME	.35**	.31**	.27**	.34**	-.16**	-.42**	1.00	

**. Correlation is significant at 0.01 level

*. Correlation is significant at 0.05 level

a. Cells contain zero-order (Pearson) correlations.

Table VIII:
Correlations separated by males/females

Child's Gender:		WJ-LW	WJ-AP	WJ-AP 1G	WJ-LW 1G	WJ-WA 1G	AF	AL	HOME	P 41/2	P 1G
Male	WJ-LW	1									
	WJ-AP	.565**	1								
	WJ-AP 1G	.528**	.684**	1							
	WJ-LW 1G	.569**	.443**	.565**	1						
	WJ-WA 1G	.498**	.424**	.512**	.866**	1					
	AF	.340**	.328**	.252**	.247**	.231**	1				
	AL	-.091*	-.070	-.045	-.027	.008	-.428**	1			
	HOME	.388**	.429**	.396**	.340**	.306**	.361**	-.156**	1		
	Parenting	-.088	-.056	.041	-.030	-.028	.034	.010	-.018	1	
	Parenting 1G	-.225**	-.335**	-.298**	-.165**	-.172**	-.243**	.078	-.421**	.042	1
Female	WJ-LW	1									
	WJ-AP	.603**	1								
	WJ-AP 1G	.546**	.616**	1							
	WJ-LW 1G	.549**	.452**	.594**	1						
	WJ-WA 1G	.460**	.429**	.577**	.838**	1					
	AF	.215**	.259**	.257**	.218**	.241**	1				
	AL	-.086	-.090*	-.085	-.067	-.049	-.390**	1			
	HOME	.465**	.416**	.400**	.399**	.353**	.347**	-.141**	1		
	Parenting	.091	.057	.006	.029	.013	-.102	.087	-.008	1	
	Parenting 1G	-.390**	-.406**	-.324**	-.287**	-.331**	-.313**	.145**	-.451**	.024	1

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Hierarchical Regressions

Table IX:
Summary of hierarchical multiple regression analysis with children's reading at 4 ½ years as criterion. Interaction terms of proximal processes x temperament (activity) in blocks 5-6.

Block and predictor variable	*B*	*SE B*	*β*	R^2	$R^2\Delta$
Block 1:				.06***	
SES	.89	.16	.23***		
Gender	.39	1.2	.01		
Block 2:				.10***	.05***
AL	.80	.85	.04		
AF	3.81	.75	.23***		
Block 3:				.10	.00
Parenting	.03	.03	.04		
Block 4:				.20***	.09***
HOME	.90	.12	.34***		
Block 5:				.20	.00
AL x Parenting	-.02	.04	-.12		
Block 6:				.20	.00
AL x HOME	.08	.13	.24		

Note: SES= Socioeconomic Status, AL= Activity Level, AF = Attention Focusing
* $p < .05$ ** $p < .01$ *** $p < .000$

Table X:
Summary of hierarchical multiple regression analysis with children's reading at 4 ½ years as criterion. Interaction terms of proximal processes x temperament (attention) in blocks 5-6.

Block and predictor variable	*B*	*SE B*	*β*	R^2	$R^2\Delta$
Block 1:				.06***	
SES	.90	.16	.23***		
Gender	.40	1.20	.01		
Block 2:				.10***	.05***
AL	.80	.85	.04		
AF	3.81	.75	.23***		
Block 3:				.10	.00
Parenting	.03	.03	.04		
Block 4:				.20***	.10***
HOME	.90	.12	.34***		
Block 5:				.20	.00
AF x Parenting	.04	.04	.04		
Block 6:				.20	.00
AF x HOME	.06	.13	.02		

Note: SES= Socioeconomic Status, AL= Activity Level, AF = Attention Focusing
** p < .05 ** p < .01 *** p < .001*

Table XI:
Summary of hierarchical multiple regression analysis with children's mathematics at 4 ½ years as criterion. Interaction terms of proximal processes x temperament (activity) in blocks 5-6.

Block and predictor variable	*B*	*SE B*	*β*	R^2	$R^2\Delta$
Block 1:				.070***	
SES	1.10	.18	.25***		
Gender	1.83	1.30	.06		
Block 2:				.15***	.08***
AL	1.13	.93	.06		
AF	5.70	.82	.31***		
Block 3:				.15	.00
Parenting	.01	.04	.02		
Block 4:				.23***	.07***
HOME	.90	.13	.30***		
Block 5:				.23	.00
AL x Parenting	-.03	.05	-.16		
Block 6:				.23	.00
AL x HOME	-.08	.14	-.20		

Note: SES= Socioeconomic Status, AL= Activity Level, AF = Attention Focusing
* $p < .05$ ** $p < .01$ *** $p < .000$

Table XII:
Summary of hierarchical multiple regression analysis with children's mathematics at 4 ½ years as criterion. Interaction terms of proximal processes x temperament (attention) in blocks 5-6.

Block and predictor variable	*B*	*SE B*	*β*	R^2	$R^2\Delta$
Block 1:				.070***	
SES	1.10	.18	.25***		
Gender	1.83	1.30	.06		
Block 2:				.15***	.08***
AL	1.13	.93	.06		
AF	5.70	.82	.31***		
Block 3:				.15	.00
Parenting	.01	.04	.02		
Block 4:				.23***	.07***
HOME	.90	.13	.30***		
Block 5:				.23	.00
AF x Parenting	.00	.04	.00		
Block 6:				.23	.00
AF x HOME	.14	.14	.04		

Note: SES= Socioeconomic Status, AL= Activity Level, AF = Attention Focusing
** p < .05 ** p < .01 *** p < .000*

Table XIII:
Summary of hierarchical multiple regression analysis with children's mathematics in 1st grade as criterion. Interaction terms of proximal processes x temperament (attention) in blocks 5-6.

Block and predictor variable	*B*	*SE B*	*β*	R^2	$R^2\Delta$
Block 1:				.07***	
SES	1.30	.17	.26***		
Gender	-3.02	1.09	-.09**		
Block 2:				.12***	.05***
AL	1.40	.78	.06		
AF	4.90	.70	.25***		
Block 3:				.16***	.03***
Parenting	-.20	.03	-.20***		
Block 4:				.20***	.03***
HOME	.72	.12	.22***		
Block 5:				.20	.00
AF x Parenting	-.01	.04	-.01		
Block 6:				.20	.00
AF x HOME	.05	.14	.01		

Note: SES= Socioeconomic Status, Gen = Gender, AL= Activity Level, AT = Attention, CG=caregiver beliefs (4 ½ years), HM = Home environment
** p < .05 ** p < .01 *** p < .000*

Table XIV:
Summary of hierarchical multiple regression analysis with children's mathematics in 1st grade as criterion. Interaction terms of proximal processes x temperament (activity) in blocks 5-6.

Block and predictor variable	*B*	*SE B*	*β*	R^2	$R^2\Delta$
Block 1:				.07***	
SES	1.30	.17	.26***		
Gender	-3.02	1.09	-.09**		
Block 2:				.12***	.05***
AL	1.40	.78	.06		
AF	4.90	.70	.25***		
Block 3:				.16***	.03***
Parenting 1G	-.20	.03	-.20***		
Block 4:				.20***	.03***
HOME	.72	.12	.22***		
Block 5:				.20	.00
AL x Parenting 1G	.049	.04	.04		
Block 6:				.20	.00
AL x HOME	-.09	.15	-.02		

Note: SES= Socioeconomic Status, Gen = Gender, AL= Activity Level, AF = Attention, HM = Home environment
** p < .05 ** p < .01 *** p < .001*

Table XV:
Summary of hierarchical multiple regression analysis with children's reading in 1st grade as criterion. Interaction terms of proximal processes x temperament (activity) in blocks 5-6.

Block and predictor variable	*B*	*SE B*	*β*	R^2	$R^2\Delta$
Block 1:				.03***	
SES	.65	.16	.14***		
Gender	2.24	1.03	.07*		
Block 2:				.07***	.04***
AL	1.31	.75	.06		
AF	4.20	.67	.23***		
Block 3:				.08***	.01***
Parenting	-.11	.03	-.12		
Block 4:				.12***	.04***
HOME	.76	.12	.25***		
Block 5:				.12	.00
AL x Parenting	.01	.04	.05		
Block 6:				.13	.00
AL x HOME	-.14	.14	-.35		

Note: SES= Socioeconomic Status, Gen = Gender, AL= Activity Level, AT = Attention, CG=caregiver beliefs (4 ½ years), HM = Home environment
** p < .05 ** p < .01 *** p < .000*

Table XVI:
Summary of hierarchical multiple regression analysis with children's reading in 1st grade as criterion. Interaction terms of proximal processes x temperament (attention) in blocks 5-6.

Block and predictor variable	*B*	*SE B*	*β*	R^2	$R^2\Delta$
Block 1:				.03***	
SES	.65	.16	.14***		
Gender	2.24	1.03	.07*		
Block 2:				.07***	.04***
AL	1.31	.75	.06		
AF	4.20	.67	.23***		
Block 3:				.08***	.01***
Parenting	-.11	.03	-.12		
Block 4:				.12***	.04***
HOME	.76	.12	.25***		
Block 5:				.12	.00
AF x Parenting	-.04	.04	-.19		
Block 6:				.13	.00
AF x HOME	.13	.13	.44		

Note: SES= Socioeconomic Status, Gen = Gender, AL= Activity Level, AT = Attention, CG 1G=caregiver beliefs (1st grade), HM = Home environment
** p < .05 ** p < .01 *** p < .000*

Table XVII:
Summary of hierarchical multiple regression analysis with children's phonics in 1st grade as criterion. Interaction terms of proximal processes x temperament (attention) in blocks 5-6.

Block and predictor variable	*B*	*SE B*	*β*	R^2	$R^2\Delta$
Block 1:				.02***	
SES	.55	.14	.13***		
Gender	.143	.94	.01		
Block 2:				.06***	.05***
AL	1.78	.69	.10**		
AF	4.02	.61	.24***		
Block 3:				.09***	.02***
Parenting 1G	-.14	.03	-.17***		
Block 4:				.11***	.02***
HOME	.51	.11	.18***		
Block 5:				.11	.00
AF x Parenting 1G	.03	.03	.03		
Block 6:				.11	.00
AF x HOME	.15	.12	.05		

Note: SES= Socioeconomic Status, Gen = Gender, AL= Activity Level, AF = Attention, HM = Home environment
** p < .05 ** p < .01 *** p < .001*

Table XVIII:
Summary of hierarchical multiple regression analysis with children's phonics in 1st grade as criterion. Interaction terms of proximal processes x temperament (activity) in blocks 5-6.

Block and predictor variable	*B*	*SE B*	*β*	R^2	$R^2\Delta$
Block 1:				.02***	
SES	.55	.14	.13***		
Gender	.14	.94	.01		
Block 2:				.06***	.05***
AL	1.78	.68	.10**		
AF	4.02	.61	.24***		
Block 3:				.09***	.02***
Parenting 1G	-.14	.03	-.17***		
Block 4:				.11***	.02***
HOME	.51	.11	.18***		
Block 5:				.11	.00
AL x Parenting 1G	.00	.04	.00		
Block 6:				.11	.00
AL x HOME	-.107	.13	-.03		

Note: SES= Socioeconomic Status, Gen = Gender, AL= Activity Level, AF = Attention, HM = Home environment
** p < .05 ** p < .01 *** p < .001*